SURVEY OF CONDITIONS OF THE INDIANS IN THE UNITED STATES

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON INDIAN AFFAIRS UNITED STATES SENATE

SEVENTY-FIRST CONGRESS

SECOND SESSION

PURSUANT TO

S. Res. 79

(70TH CONGRESS)

A RESOLUTION DIRECTING THE COMMITTEE ON INDIAN AFFAIRS OF THE UNITED STATES SENATE TO MAKE A GENERAL SURVEY OF THE CONDITION OF THE INDIANS OF THE UNITED STATES

AND

S. Res. 308

(70TH CONGRESS)

CONTINUING UNTIL THE END OF THE FIRST REGULAR SESSION OF THE SEVENTY-FIRST CONGRESS SENATE RESOLUTION NUMBERED 79 AUTHORIZING A GENERAL SURVEY OF INDIAN CONDITIONS

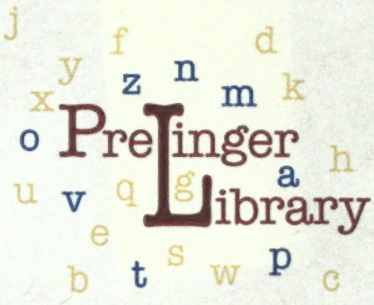
PART 6

JANUARY 21, 1930

Printed for the use of the Committee on Indian Affairs

UNITED STATES
GOVERNMENT PRINTING OFFICE
26465 WASHINGTON: 1930

From the collection of the



San Francisco, California
2008

SURVEY OF CONDITIONS OF THE INDIANS IN THE UNITED STATES

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON INDIAN AFFAIRS UNITED STATES SENATE

SEVENTY-FIRST CONGRESS

SECOND SESSION

PURSUANT TO

S. Res. 79

(70TH CONGRESS)

A RESOLUTION DIRECTING THE COMMITTEE ON INDIAN AFFAIRS OF THE UNITED STATES SENATE TO MAKE A GENERAL SURVEY OF THE CONDITION OF THE INDIANS OF THE UNITED STATES

AND

S. Res. 308

(70TH CONGRESS)

CONTINUING UNTIL THE END OF THE FIRST REGULAR SESSION OF THE SEVENTY-FIRST CONGRESS SENATE RESOLUTION NUMBERED 79 AUTHORIZING A GENERAL SURVEY OF INDIAN CONDITIONS

PART 6

JANUARY 21, 1930

Printed for the use of the Committee on Indian Affairs

UNITED STATES
GOVERNMENT PRINTING OFFICE
26465 WASHINGTON: 1930

COMMITTEE ON INDIAN AFFAIRS

LYNN J. FRAZIER, North Dakota, *Chairman*

THOMAS D. SCHALL, Minnesota.
W. H. McMASTER, South Dakota.
ROBERT M. LA FOLLETTE, JR., Wisconsin.
W. B. PINE, Oklahoma.
FREDERICK STEIWER, Oregon.
FREDERIC C. WALCOTT, Connecticut.
HENRY F. ASHURST, Arizona.
JOHN B. KENDRICK, Wyoming.
BURTON K. WHEELER, Montana.
SAM G. BRATTON, New Mexico.
ELMER THOMAS, Oklahoma.

NELSON A. MASON, *Clerk*
WILLIAM O. SKEELS, *Assistant Clerk*

SUBCOMMITTEE ON SENATE RESOLUTION 79

LYNN J. FRAZIER, North Dakota, *Chairman*

ROBERT M. LA FOLLETTE, JR., Wisconsin.
W. B. PINE, Oklahoma.
BURTON K. WHEELER, Montana.
ELMER THOMAS, Oklahoma.

NELSON A. MASON, *Clerk*
WILLIAM O. SKEELS, *Assistant Clerk*

CONTENTS

WITNESSES

	Page
Arnold, L. D	2744
Bonnin, R. T	2738, 2742
Collier, John	2712, 2725, 2729, 2747
Crawford, D. W	2742
Crawford, Ida M	2750
Engle, C. A. (*see also* Preston, Teele)	2210
Flickinger, S. J	2199
Frear, Hon. James A	2204, 2661, 2713
Goodrich, Chauncy S. (memorandum of)	2717
Preston, Porter J. (report of) (*see also* Engle)	2210
Rhoads, Charles J., Commissioner of Indian Affairs	2197, 2209, 2674, 2738, 2740
Scattergood, J. Henry, Assistant Commissioner of Indian Affairs	2198, 2210, 2742, 2749, 2750
Teele, Ray P. (*see* Engle and Preston)	2210

EXHIBITS

American Indian Defense Association, statement of	2725
Indian irrigation service statement of costs, fiscal year 1928, and totals to June 30, 1928 (tabulations)	2662–2673
Preston-Engle report	2210–2661
Reimbursable accounts between United States and various Indian tribes, fiscal year ended June 30, 1928	2675–2711
Reimbursable charges, memo of Goodrich, Chauncy S	2717
Reimbursable Indian debts	2725

SURVEY OF CONDITIONS OF THE INDIANS IN THE UNITED STATES

TUESDAY, JANUARY 21, 1930

UNITED STATES SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON INDIAN AFFAIRS,
Washington, D. C.

The subcommittee met, pursuant to call, at 10 o'clock a. m., in the committee room, Senate Office Building, Senator Lynn J. Frazier presiding.

Present: Senators Frazier (chairman), Pine, La Follette, Wheeler, and Thomas. Senators McMaster, Steiwer, Wolcott, Ashurst, and Kendrick were also present.

Present also: Charles J. Rhoads, Commissioner of Indian Affairs; J. Henry Scattergood, Assistant Commissioner of Indian Affairs; Wendall M. Reed, chief irrigation engineer; H. V. Clatts, chief irrigation engineer; S. J. Flickinger, irrigation attorney; J. R. T. Reeves, acting chief counsel, Indian Bureau; and Lewis Meriam, representing Institute for Government Research.

The CHAIRMAN. The hearing will come to order. This hearing was called especially to consider suggestions made by Commissioner Rhoads and the department in regard to the reimbursable features of the Indian appropriations. We invited the commissioner and assistant commissioner here, and I see they are present. We will call on Commissioner Rhoads for any suggestions he may have to make in regard to this matter.

STATEMENT OF CHARLES J. RHOADS, COMMISSIONER OF INDIAN AFFAIRS, WASHINGTON, D. C.

Mr. RHOADS. Mr. Chairman and gentlemen of the committee, I am coming here more to learn than to tell you how it should be done. I am altogether new to this, and I am very much bewildered by the complexity of the whole question of reimbursable debts.

Senator PINE. Have you someone in your organization that can advise the committee what your organization thinks ought to be done?

Mr. RHOADS. I don't think we have a ready-made solution for the whole thing. It is a very complicated matter that will have to be studied quietly and thoughtfully. In many cases we would have to get down to the details of the particular operation.

Senator THOMAS. Don't you think each particular case would have to rest on its own merits and be worked out as an individual proposition rather than to apply some general formula?

Mr. RHOADS. I rather think so. I think there will probably be certain general underlying principles that will be guiding.

Senator THOMAS. As a general proposition, do you think that all these reimbursable provisions of the law should be repealed, and even this land cleared of all these liens?

Mr. RHOADS. I wouldn't want to go as far as that without further study. I think some of them ought to be judged on their merits.

Senator THOMAS. As a legal propostion do you think that Congress had the power to place a lien on lands that were being held by the Government itself?

Mr. RHOADS. Senator, I am not a lawyer, and I would hesitate to give an opinion on that. As a layman it looks to me as if it were a question to be studied.

Senator THOMAS. There is no bill pending, is there, Mr. Chairman, on this question?

The CHAIRMAN. No.

Senator THOMAS. This is just a preliminary discussion?

The CHAIRMAN. Just a preliminary discussion; yes.

Senator PINE. There is considerable confusion, isn't there, because of the fact that Congress has passed different laws and attempted to meet special conditions on different reservations?

Mr. RHOADS. Yes, sir. There are general laws, and there are special laws, and they are sometimes conflicting.

Senator PINE. In Montana we found one reservation where the Government was attempting to collect construction charges against a piece of inherited land that had been bought by a white man and deeded to him free of any obligations. There seems to be considerable confusion because the Government apparently has no well-defined policy.

The CHAIRMAN. We also found in Montana, on one or two reservations where a good deal of money had been spent for irrigating projects especially on the reimbursable plan in connection with Indian land, and after several years they are now recommending abandonment of those projects. It seems to me there should be no question in a case of that kind as to the duty of Congress to take care of the reimbursable charges of that nature, at least, against Indian property.

Mr. RHOADS. It would seem so. Perhaps some of those projects will have to be reorganized and some of them will have to take up the loss.

The CHAIRMAN. The Fort Peck Reservation, especially, as I recall, had come to the conclusion that it wasn't practical and that it shouldn't have been started in the first place, but several million dollars were spent there—I have forgotten the exact amount—before the Government engineers came to that conclusion.

Senator LA FOLLETTE. Have you assembled any where these reimbursable projects—irrigation, roads and bridges, expenditures of that kind, on the various Indian reservations, so that that data would be available?

The CHAIRMAN. We have a copy of all those various items.

Senator LA FOLLETTE. I should think that ought to be in the record.

The CHAIRMAN. Yes. We will place that in the record.

Mr. SCATTERGOOD: May I suggest that the study as a whole ought to be directed along two main lines—first of all, a readjudication of all these Indian laws, bearing in mind the trend of the irrigation and reclamation projects; secondly, as Mr. Rhoads has suggested, a

careful study of each project on its own merits with a view to finding out how much if any will eventually have to be marked off as impossible of ever recovering charges now on the books as reimbursable—and then preserving at the same time certain parts of the projects. For instance, in the Fort Peck Reservation some parts are good, those parts that have hopes for the future. If a reorganization of that kind could take place, then the project could go on afterwards on its merits, the same as every kind of project that Congress itself authorizes and furnishes the funds for.

Senator LA FOLLETTE. Some years ago Secretary Work appointed a committee to investigate these irrigation projects, and the committee made a report. Is that report full and complete? Does it cover the matter that you have in mind, or not?

Mr. SCATTERGOOD. There has been a great deal of piecemeal legislation, and two or three of these projects have been studied along that line, but by no means completely have all of them been studied, but the hope was that the same kind of thing would be done and carried further if we could get rid of this piecemeal legislation which results in confusion.

Senator LA FOLLETTE. Have you gone over this report made by Porter J. Preston and Charles A. Engle in June, 1928?

Mr. RHOADS. Well, of course, that is in the office and has been gone over.

The CHAIRMAN. In this report that I have before me there is a statement in regard to irrigation on the Blackfoot Reservation. Here the statement is made that the problem presents a hopeless situation. And the same statement is made in regard to the project on the Fort Peck Reservation. It is designated as a hopeless failure. It would seem to me that in cases of that kind there is nothing else for the Government to do, for Congress to do, than to cancel any reimbursable debt of that kind, at least, that has been charged up to the Indians. Then, in the list that we have, there are roads, bridges, and items of that kind from which apparently little value is coming to the Indians. Most of it has been for the benefit of tourists in continuing through roads that happen to run across an Indian reservation, or bridges on Indian reservations on these roads. What is your opinion, Mr. Commissioner, in regard to reimbursable features of that kind, whether for roads or bridges?

Mr. RHOADS. Well, in general, I should think it ought to be based on whether it is for the benefit of the Indians, or for the benefit of the general public. I would be persuaded to charge up to the Indians all these roads and bridges that run across their reservations.

The CHAIRMAN. Well, it seems to me that it has to be a strong stretch of the imagination to consider that a bridge costing several hundred thousand dollars was for the welfare of the Indians.

Mr. RHOADS. That is what I meant to imply.

The CHAIRMAN. In this table that we have there is a column designated as "carried to surplus funds." That is evidently a portion of the reimbursable amount that has not been expended up to date. Do you happen to know anything about that particular fund?

Mr. RHOADS. I am afraid I don't.

Mr. FLICKINGER. I believe that represents unexpended balance of original appropriations, and, of course, is not charged as reimbursable.

The CHAIRMAN. What is the present status of that fund? Is it just carried in the surplus funds?

Mr. FLICKINGER. Oh, no; that has been reverted to the Treasury.

The CHAIRMAN. Well, why is it reported here, then, as carried still in the surplus funds? For instance, here is an item for the Chippewa Lake Superior Indians. The law was passed in 1872. The amount appropriated was $75,000. The sum of $31,000 was expended. In 1875 there was $43,963.83 carried to surplus fund, and still shows in the surplus funds, according to this table.

Mr. FLICKINGER. With reference to that irrigation item I don't know. We would have to check that up.

The CHAIRMAN. This is removal and settlement of bands of the Chippewa Indians of Lake Superior.

Senator LA FOLLETTE. Assuming, Mr. Commissioner, that Congress should decide that it wanted to revaluate the benefits of these reimbursable appropriations, have you any project in mind as to how that could be accomplished, or is the department conducting any investigation with the end in view of arriving at a decision with respect to these various projects, as to whether or not they were actually for the benefit of the Indians or the whites?

Mr. RHOADS. Well, Senator, we want your advice and help in solving these problems. These laws have been passed over a period of years and we are bound by them, and it is hard to operate in many cases. We thought it was only fair to bring the matter to your attention. We would be very glad to cooperate in any studies that might be made, but frankly we are pretty busy and you are pretty busy, and we would want to get relief so that we could be more efficient.

Senator LA FOLLETTE. No such investigation is being made now by the bureau?

Mr. RHOADS. No, sir.

Senator LA FOLLETTE. Well, of course, it seems to me, after hastily looking over this tabulation that is before us, that to conduct an individual investigation into these various projects is going to be a very arduous and a very lengthy task, and I take it, from your letter to the chairman that you feel that you are in need of some more speedy determination of what policy is to be followed in regard to these reimbursable appropriations than would be possible if a detailed examination is going to be made of every project. Is that correct?

Mr. RHOADS. If I get your question correctly, my thought is that it would be dangerous legislation without a careful study of the details. On the other hand, we wish to avoid piecemeal legislation, which is very often hard to carry through, and it conflicts with other laws.

Senator LA FOLLETTE. Well, I take it, in view of the situation surrounding the allotment of these lands, that the problem is rather pressing.

Mr. RHOADS. Very.

Senator LA FOLLETTE. And if the problem is pressing, the point that I raise for consideration is, whether it is feasible or not for the executive departments or the Congress to make the detailed investigation which would be necessary, if we are going to test every one of these projects to ascertain whether or not they were a legitimate charge against the Indians. And the point that I would like to get your opinion about is, whether you feel, as a result of your study of this particular aspect of the problem, that a detailed survey of each one

of these projects is a necessary preliminary step to the adoption of legislation by the Congress.

Mr. RHOADS. So far as irrigation projects go. I think that a detailed and thorough study, such as was done in the Reclamation Service, would be essential before you pass general legislation. As to the general land laws, I think it would require some study before you could pass general legislation.

Senator LA FOLLETTE. Well, what do the surveys of Secretary Work's investigation show concerning these irrigation projects? Has that data been assembled in any way so that it is available for study, as to the result of their findings? For instance, they made studies of certain projects; there are some of them here on the table with the committee now where they report—I remember one phase used in the report—"This project is a hopeless failure." Do you think that that study was thorough enough so that the Congress could proceed to accept it as a basis for taking action with respect to the projects upon which that advisory commission reported?

Mr. RHOADS. As I understand that particular report it suggested further studies, and it is not final.

Senator LA FOLLETTE. Well, is that true of their reports on these other irrigation projects?

Mr. RHOADS. There is no report, so far as I know.

Mr. SCATTERGOOD. That related to Blackfoot.

Senator LA FOLLETTE. Blackfoot. Were those the only two studied?

Mr. SCATTERGOOD. They were the ones recommended in that printed report to be abandoned. There were about 17, all told.

Senator LA FOLLETTE. In your opinion, Mr. Commissioner, were those investigations merely preliminary, or do you think that any of them were final and that a judgment could be soundly based upon them?

Mr. RHOADS. As I recall, they were more preliminary than final.

Senator LA FOLLETTE. Well, if I remember, that group was engaged in this work for a good many months, were they not?

Mr. RHOADS. Yes, sir.

Senator LA FOLLETTE. At that rate of procedure, assuming that a committee of Congress could devote all its time to it, we would all be a lot older before we would have any definite information upon which to proceed.

Mr. RHOADS. It certainly would be so, if you did it all yourselves.

Senator LA FOLLETTE. Have you any suggestion as to how this problem could be approached, so that we could come to some determination of it within a reasonable length of time?

Mr. RHOADS. Well, Senator, just as a suggestion, I thought that possibly you might appoint a small subcommittee with authority to appoint counsel or other qualified persons to take up these problems—irrigation, reimbursables for roads, bridges, and so on; and then the other subjects mentioned in the other letters. I assume, with all the good will in the world, that you men are all busy, with every minute of the day occupied, and the same is true with us. We would all be glad to contribute everything we have in the way of knowledge and information. I doubt whether our bureau is competent to take it up, and I assume that you can do it all yourselves.

Senator PINE. Don't you think that this report gives a fair picture of the situation as it existed at the time the report was made, a general picture of the situation with respect to these reimbursable items covering irrigation projects? This covers practically all the irrigation projects and was prepared by a committee of experts selected by Secretary Work. And if their findings are correct it should be a fair picture of the situation at the time the report was made?

Mr. SCATTERGOOD. I think so; but I think that it suggested further means, didn't it? In nearly all cases I think it suggested further studies.

Senator PINE. I would suggest that we start by having this report printed.

The CHAIRMAN. I notice in this report that they make recommendations on each project. In connection with their recommendation in regard to irrigation on the Blackfoot Reservation in Montana, for instance, it says:

> In view of the conditions described in our report on this project, particularly in sections 2 and 18 thereof, we think it is shown, in the judgment of the advisers, that this project presents a hopeless situation for which there is no feasible remedy; and, since the continuance of the project can serve only to increase the large loss that eventually will have to be met, it is recommended, first, that this project be abandoned at the close of this irrigation season of 1928, making such arrangements with lessees and white landowners now on the project as may be equitable.

Didn't the appropriations bill for this year carry some further appropriations for the Blackfoot Reservation, the irrigation project?

Mr. RHOADS. Yes, sir. Neither the bureau, nor the Budget Bureau, nor the House Appropriations Committee, so far, has taken that recommendation as final and complete to the point of entire abandonment of the Blackfoot proposition. However, parts of it are held in abeyance while other parts are being approved; and that is a perfect example of the need for further study of that report as a beginning.

The CHAIRMAN. The amount of the appropriation, as I recall, according to this hearing, was $91,500, the original estimate for the Blackfeet Reservation. At our hearing out on the Blackfeet Reservation the Indians seemed to be very much opposed to further expenditures of money for that project. They claim that the altitude is so high that they couldn't raise very much of anything, and that they had killing frosts every month of the year, and they are very much opposed to further expenditures and charging them up against their lands. Have you anything further to suggest, Mr. Commissioner?

Mr. RHOADS. Mr. Chairman, I did think that it was the function and duty of Congress to determine as a matter of policy whether the reimbursable plan of appropriations is to be continued. I think we want to determine on a policy.

The CHAIRMAN. I think that should be done, by all means.

Senator PINE. And the commission can not abandon a project until the Congress acts.

Mr. RHOADS. Exactly. Personally I think it puts us in a very bad light, as we seem to be arbitrary and whimsical in the way we act. Of course, we can't depart from the way Congress authorizes.

Senator PINE. To date, is it the policy of the bureau to carry on these irrigation projects until that policy is changed?

Mr. SCATTERGOOD. We haven't in mind so much the idea of abandonment. Personally, I don't think we have reached any such conclusion in any case, but I do feel that what we need is a reorganization, and cutting down the deadwood and getting down to the real worth-while part and building that up, and abandoning the balance.

The CHAIRMAN. As I remember, the Fort Peck project has been abandoned, has it not?

Mr. SCATTERGOOD. Not entirely. There is an item under discussion now in the deficiency bill for rehabilitating certain parts of that Fort Peck project. The last year's bill terminated the funds available on the 1st of January. In the deficiency bill we had suggested a plan which amounted to a reorganization and abandoning part of it, and considering the other parts. We have had no hearing on that yet.

Senator LA FOLLETTE. What investigation was made by the bureau before it was determined portions of that project be abandoned?

Mr. FLICKINGER. We had investigations made. On the suggestion as to a reorganization an investigation was made by the superintendent of the Fort Peck Reservation. The supervising engineer of irrigation district No. 3, Mr. Hanna, and Mr. Clotts, our chief engineer, also went over the project and found that as to a part of it, it was believed that it was economical and feasible to continue the Fort Peck project. Certain recommendations were made with a view to continuing part of that project. The rest of it will probably have to be abandoned.

Senator LA FOLLETTE. Well, have any such investigations been made of any of these other irrigation projects by the bureau?

Mr. SCATTERGOOD. We are doing it all the time. It is part of the current work. We take up one at a time on its merits. We are well aware of the obligations of the problem and the need for relief in a way that has not yet been authorized.

The CHAIRMAN. The recommendations of Secretary Work's commission that in some cases investigations be made by engineers outside of the Reclamation Service of the Interior Department, as to the advisability of a continuance of some of these projects, seems to be a good idea. I don't know but what that would be a very good thing to follow out. Engineers that made a mistake in recommending a project in the first place would naturally try to get out of it by trying to save their own recommendations if possible.

Mr. RHOADS. But they have no authority to do that.

The CHAIRMAN. I understand that.

Mr. RHOADS. Not only from the engineering point of view but from the economic point of view, it is worth doing.

The CHAIRMAN. A study of these conditions should be made, of course, with a view to cancelling these reimbursable debts where they have not been justified, at least from the viewpoint of the welfare of the Indians.

Do you wish to make any other statement, Mr. Commissioner?

Mr. RHOADS. I don't think so, Senator.

The CHAIRMAN. Mr. Scattergood, do you care to make any further statement?

Mr. SCATTERGOOD. No, Mr. Chairman; we have covered the general features of the need of relief, and the only thing now is that consideration be given to some constructive policy that would enable an honest

step to be taken in the way of codification of all these laws covering the engineering and economic feature of these cases, out of which would come specific recommendations covering these reimbursable items. We are not prepared to propose anything of that kind until further study has been made.

The CHAIRMAN. Congressman Frear, have you any statement to make in regard to these reimbursable debts?

STATEMENT OF HON. JAMES A. FREAR, MEMBER OF CONGRESS

Representative FREAR. Mr. Chairman and gentlemen of the committee: I was asked to come here to speak of some of the things I know in regard to reimbursable bridge charges against the Indians, and I am prepared to speak of some of these because I have examined them and know conditions surrounding them just as well as an engineer or any one else because of the peculiar situation that occurs in each case.

I will say this, that two policies apparently are possible, from suggestions made across the table this morning. One is to await examinations that may result in a half century's delay to determine the facts and relation to the alloted Indians' property—what rights they have that are now chargeable with all these reimbursable mortgages on their funds.

Another course is immediate action upon those demonstrated to be entirely unjustifiable whether recommended by the Secretary of the Interior or anyone else.

Charging the Indians with reimbursable funds based on bureau recommendations has become a public scandal. I want to say here, because this is a matter of interest to these gentlemen here represent the Indian Bureau, because I have high respect for them and believe they are anxious to do what all of us are trying to do—if it had not been for this Senate committee disclosing conditions existing throughout the country the American Indians would have made little progress or had little hope. The new bureau officials I trust will improve conditions.

I want to thank the committee for what you have done. I believe that Mr. Collier and two or three others of us who have helped in the investigation of Indian matters at our own expense appreciate more than any others the work that has been done by this Senate committee.

If I may speak briefly of things that I came to discuss, I will submit that any jury of 12 men will not find one man disagreeing with our findings, generally speaking. Some of the Indian bridge frauds are known by the chairman because I know personally that he has followed up the investigation which we first made.

Another thought, it would be impossible to secure any disagreement from the action that has been taken by past agents, past bureau commissioners, by the same agents if there now, as they are bound by the action that occurred before. You must employ people from the outside who are disinterested and who will make a fair investigation and act independently.

"Spanning the Colorado" is the Lees Ferry Indian bridge. There isn't a particle of justification for that charge against the Navajos. It was so explained on the floor of the House and was so explained

in the Senate, where it was called "highway robbery" by Senator Cameron and when Senator Bratton characterized it "an iniquity." Yet, with the indorsement of the Indian Commissioner it was supported by Secretary of the Interior Work and so the bill passed Congress with a $100,000 charge against these poor Indians, who need all the help you can give them, because not one dollar of that charge was justifiable. I am not exaggerating in my statement of the situation we found at Lees Ferry.

Let me read from a statement which has just been handed to me, Mr. Chairman, relating to the first bridge I will discuss. It is written by N. C. McLoud and is an attractive picture of what is afforded auto tourists by the Lees Ferry bridge (reading):

> This first bridge (Lees Ferry) to span the canyon provides a channel of travel to some of the finest scenic features of the American continent. Located near the Grand Canyon and just below Lees Ferry, the structure opens a route to the upper portion of Coconino County and across the border into Utah, giving the motor tourist a road by which he may reach regions heretofore inaccessible without laborious effort and hardship.

The statement goes on to explain the wonderful things that a tourist will see by the aid of the Lees Ferry bridge. That is all true, but no more dishonest action ever occurred in Congress than to charge that up against the Indians, because they will never get one dollar's worth of benefit from it. I went personally to visit the location, not with Indian agents, for no Indians or Indian agents live within many miles of the bridge. I want to quote just briefly not my own findings, but the findings of your own Indian rights organization, M Commissioner. You can't go beyond that, because I don't thi there is any more conservative organization than the Indian Righ Association, of Philadelphia; but first here's what Secretary Wo says about this bridge. I want to develop the subject and sh what reliance can be placed on a report given by Secretary of Interior Work to Congress when prepared by the Indian Bur Commissioner. I am quoting from a speech made by me in House three years ago. Secretary Work reported (reading):

> The bridge will furnish an important outlet for the Navajo Indians, facilit their communication with the whites and assisting them in their progress more advanced civilization. In view of the fact that they will derive benefit from the proposed bridge, estimated to equal the benefit which w derived by the white settlers, it would be reasonable that the $100,000 be reimbursable to the United States and remain a charge upon the lands and of these Indians until paid.

That is Secretary Work's report to Congress. That w finding, his report to Congress, and upon that report they base Navajo bridge $100,000 reimbursable proposition. Senator Ca with Senator Bratton in the Senate disclosed the falsity statement.

Now, I will read from a statement I furnished the House b my own examination of the situation at Lees Ferry. Only on road runs to Lees Ferry. [Reading:]

> No other road north of the Colorado River or on the south side c Lees Ferry or at any point within many miles of the ferry that we We were on the only road traveled.

Anything that would go down to the ferry had to go a miles around from the north to the south side of the canyo Jacob's Pool, on the north side of the river, we drove abou

to Lees Ferry. I drove with Mr. Collier, who is present here to-day. Only one settler was met on the north side about half way to the ferry, and one house, out in the desert, only one. And let me say, by way of parenthesis, the man who lived there had two horses with him and he spent his time in pulling an occasional automobile out of the sand, and he told us he charged from $3 to $5 for that service. And that was the way the only settler on the north side for 65 miles made his living. This is from my diary made at the time. [Reading:]

During the last 35 miles of the drive to the ferry we did not meet a soul on the road or see a tree or a single water hole. It was deserted except for a few scattered grazing cattle during the 35 miles. Not a half dozen settlers live anywhere within 35 miles of the ferry, we were told. We crossed at the ferry over the Colorado River with Deputy Sheriff Moon running the rope ferry. He said the place was the last hole in creation; that he could handle all the traffic and averaged about two cars a day ($3 each) during September.

We drove along the south side of the Colorado River for about 50 miles (on the Navajo Reservation), and it was as deserted for the entire distance as on the north side, excepting during the last 20 miles we stopped at two small traders' shanties and saw several small Navajo hogans (houses), but it was almost as bad as on the north side, treeless and waterless, until near Tuba City, which we reached about 8 p. m.

That is the Navajo Reservation, with only one trader's store.

Now, I want to read from a paper published by the Indian Rights Association a significant statement. This simply emphasizes what the chairman of this Senate committee knows and what we all know. The writer of this article published in this Philadelphia paper says of this same bridge, which he examined afterwards [reading]:

After visiting the proposed site for the Lees Ferry Bridge over the Colorado River in Arizona, the editor does not wonder that the Navajo Indians object to having $100,000 of their funds used for its construction. Not an Indian lives within 25 miles of the site.

He might have said 50 miles and be nearer the facts. [Continuing reading:]

On the reservation side, and the nearest settlement across the river is about 80 miles distant.

The chairman of this committee puts it at 75 miles, and I will accept his figure. And this further fact I want you to keep in mind, because, Mr. Chairman, it is more important in its purpose than even the bridge debt. [Reading:]

There is now no approach to the site, and if the bridge is ever built it will be necessary to construct a road across the western part of the Navajo Reservation that will cost not less than $300,000.

This is the report of the editor of that Philadelphia Indian Rights paper. (Continuing reading:)

It is a white man's proposition and no stretch of the imagination can justify using $100,000 from the Navajo funds for such purpose.

Is there anything stronger that can confirm the report I have read of my own investigation? (Continuing reading:)

This subject was discussed at the tribal council at Fort Defiance in July, and while the Indians were willing to have funds derived from oil bonuses and rentals used for reservation improvements they were unanimously opposed to the Lees Ferry bridge scheme.

That was written by the secretary of your organization in Philadelphia, Mr. Commissioner, by Mr. Sniffen and appeared in the

Indian Rights paper in October, 1926. Do you wish any further testimony of the Navajo bridge fraud? I speak of that because I am only going to call attention to three or four bridges charged against Indian tribes in order to prove that the report of the Secretary of the Interior to Congress on these bridges was untrue in fact and without foundation. That can not be determined by the report of any Indian agent or the past Indian Commissioner because they necessarily are and were trying to sustain and carry out a policy in force at that time.

Mr. Chairman, I invite any inquiry as to the facts at any time. There can be no controversy as to the facts. To you gentlemen who now represent the bureau, and in whom I have the greatest confidence, let me say at this time, we went across other bridges. One was down on the San Juan Reservation. We called before us the president of the Pueblos who represents about 8,000 Indians, and he called the governor of one of those reservations. While we were there, not one single Indian passed over the San Juan bridge. Several Mexicans drove across while we were there, but the cost was entirely charged to the Indians on the recommendation of the Indian Bureau.

The CHAIRMAN. Where was that bridge located?

Representative FREAR. On the San Juan Reservation, on the Rio Grande River. We drove many miles to learn of this bridge because the facts had been disputed by the Indian Commissioner after I made a statement on the floor. He said his information was not the same as mine. After I had gone over and examined the bridge and surroundings I found it was a great deal worse than I originally suspected. When the governor of the Peublos was called by Mr. Collier and myself on the reservation he made the remark that not 1 Indian in 10 have any use for the bridge, which is primarily for white men. It was put through Congress without any knowledge on the part of the Indians that it was charged against them and the entire cost was charged against this Indian tribe by Congress on the recommendation of the Indian Bureau. You don't need to wait for years to determine on a change of policy of that kind, for these reimbursable charges ought to be acted upon because of the alloting of Indian lands during which time the Indians are continually defrauded.

Now, we come to a proposition that is a great deal larger and more important. I speak of the Pima Bridge, several hundred miles distant. I drove over that bridge, too. That is on a direct tourist highway from Phoenix to Tucson. I went over it at night, as I said before to your committee, Mr. Chairman, and it may be of interest to the commissioner and assistant commissioner here from the bureau to know that a beautiful concrete bridge has been built with electric-light globes on impressive lamp posts every few feet apart, a bridge that will cost in the neighborhood of several hundred thousand dollars, all charged against the Pima Indians who don't have any use for it. I have the evidence here. I will give you the names of responsible people who gave me the information at the time we were at the reservation. We went up to the Indian village. The Indians would have to drive 4 miles out of their way to use this bridge. I asked an Indian interpreter how many Indians would ever use the great costly bridge compared to the number of whites, and he said not one in a thousand. I asked who paid for the bridge, and they said they heard it was part of an irrigation project and that they also heard the Indians

were expected to pay the entire cost of this bridge and ditch that in all probability will reach nearly a million dollars; but the Indians' cost will be several hundred thousand dollars for that bridge, alone, a bridge never built for their benefit, but it is on a direct line with the Tucson traffic, just as the Lees Ferry Bridge is being built purely for the benefit of the white tourists who cross the canyon. The Pima Bridge is built for the regular automobile traffic line between the two Arizona cities of Phoenix and Tucson. The reservation white missionary, Reverend Lay, and all others gave us the same information.

The CHAIRMAN. This bridge is on the Gila River, is it not?

Representative FREAR. On the Gila River; yes. You, Mr. Chairman, have seen that bridge and know about the injustice of that act. Yet these things were not challenged in the House when the law was passed because supported by the Indian Bureau, with a recommendation of the Secretary of the Interior in most cases. The facts have only recently been disclosed and are now before this committee.

The CHAIRMAN. I want to say right there, that the Pima Indians that live just below this bridge that you are speaking of had lived there for generations, and there was evidence of irrigation ditches that these Indians had used prior to any knowledge of the white man. At the time we were there the irrigating ditch above had taken all the water that these Indians had formerly used, leaving them high and dry, and the only thing they could do was to pump water from deep wells, while the irrigation project and bridge were charged up to the Indians.

Representative FREAR. That is another gross injustice. Here's another thing: Former Assistant Commissioner Meritt in his reply read in San Francisco to some of the things that I criticized, made this statement. (Reading:)

> When the Indian dies and his estate is settled we will require the heirs to reimburse the Government for this splendid benefit that is being extended to the Indians of that (Pima) reservation.

The Indians are again robbed to build bridges for white tourists, and payment will be exacted from the little tracts now owned by these Pima Indians. There ought to be justice done to all Indians by having an immediate investigation by Congress, whether it is done by this committee or the bureau itself. I have been speaking of bridge propositions specifically. I will quote again from a brief speech I made in the House. (Reading:)

> I am informed that in 1919 Assistant Commissioner Meritt stated before the House Indian Affairs Committee more than $3,000,000 of reimbursable charges then existing against the Indian property is illegitimate and ought to be wiped out. If so, I ask who made them illegitimate, and what effort has been made by the Secretary of the Interior or Indian Commissioner Burke during the last six years to right the wrong?

From such a statement, confessing that to be the action of the bureau, there ought to be no particular delay by the present officials of the bureau in determining what bridges he had in mind when he said that $3,000,000 ought to be wiped out. I base this upon a prior Indian investigation which was made by the Snyder committee. I will quote further from my speech made in the House. [Reading:]

> What is being done with the charges and how are they being paid? For, of course, charges against the Navajos of $100,000 and against the San Juan Indians of $40,000 for a white man's bridge and $400,000 against the Pimas for a white

man's bridge can not be paid now from their tribal funds, and presumably never, because these tribes are poor and needy; nor should one dollar ever be paid by them in fact. Yet in 1919 hearings it was stated that more than $8,000,000 had already been collected from different Indian tribes and applied on their reimbursable debts.

You will find from your statement—I haven't examined it recently, but you will find where that Navajo Tribe has had other reimbursable charges which have been paid by these Indians, and they are the one tribe above all that require additional educational and health aid from the Government. We talked with doctors and we know the conditions that are to be found on these reservations. As I just quoted, in 1919 it was stated in that Snyder Indian investigation that more than $8,000,000 had been collected from the Indians.

The CHAIRMAN. This report shows a total of $1,445,214 reimbursed to the United States. That is the total, as I read these figures.

Representative FREAR. That has been returned?

The CHAIRMAN. Yes; that has been reimbursed, paid to the Government.

Representative FREAR. It was stated that more than $8,000,000 had already been collected from different Indian tribes several years ago and applied on their reimbursable debts. If that statement is incorrect it ought to be challenged by the committee and the facts known.

The CHAIRMAN. That doesn't compare with these figures in this report.

Mr. RHOADS. When you speak of reimbursable debts, we should bear in mind that there are all kinds of farm machinery, and so on. And that may be the total collected on all kinds of reimbursable debts.

Representative FREAR. I am not challenging these items, but I am speaking of the importance of it because it becomes a charge on the allotted lands of the Indians. That which is a fraud upon the Indians should be repealed by act of Congress without delay.

Now, in conclusion, Mr. Chairman, any committee that investigates the Indian question, as your committee has and is doing, among its first duties should learn the total reimbursable charges made by Congress against all the Indians, the amounts chargeable against the different tribes, the purpose of the charge and whether proper or not, and the ability of the Indians to pay such charge. Some of these Indians are not far removed from starvation and have little property of any value and only poor school facilities.

Mr. Collier and I drove through one of the reservations where they charge and collect each year part of their grazing leases to pay for public roads.

Why, these Indians are poor. When you see them you will wonder why the bureau could have made that charge against any Indian tribe. This, for example, is suggestive of the things that ought to be investigated and reported on by the bureau. And this committee ought to take such steps in recommending to Congress what should be done. I have no further interest in this respect than a desire to help the Indians.

I say to the new bureau officials, you are up against a hard proposition. You will not get this information ordinarily from Indian agents out there on reservations, and you will not get it from the Indians themselves unless they are sure they will be supported, be-

cause they are afraid and won't talk. We talked to doctors who would only speak to us when assured their names would not be used. Some of the Indians did talk to us when we told them that it was all to be treated strictly confidential.

I thank you very much. I want to conclude with another expression of thanks to this Senate Indian committee that has had the courage and the patience to go into this matter and to put some hope into the hearts of the Indians.

Mr. SCATTERGOOD. I am very glad that Mr. Frear has so eloquently pleaded the cause of the Indians in relation to bridges and roads. I am very sure that the Indian Bureau would very promtly, if asked to do so, or perhaps might volunteer, to submit revised items as to roads, bridges, and so on. We understood that the session to-day was to be devoted to ways and means in the consideration of the broad problem as a whole. We weren't expecting to submit definite propositions on any item, but will be very glad still to do so if the committee asks us later on.

Representative FREAR. I am willing to answer any questions, which I don't really believe is necessary as most of the matters are familiar to members of the Senate committee.

The CHAIRMAN. This table of reimbursable appropriations for the Indian Service carries the total amount appropriated of $41,291,000; and the amount for 1928 is $27,926,000 plus; carried to surplus fund, $1,799,000 plus; some of that dating back to 1875; and the amount of the property sold upon which this reimbursable lien stands, I take it, is $1,937,000 plus; the amount reimbursed to the United States, $1,445,000 plus; and the total amount reimbursable to the United States outstanding June 30, 1928, $34,310,000 plus.

I am going to ask that this whole table be printed as a part of the record.

Senator PINE. Mr. Chairman, I ask that the report of that committee be printed in the record.

The CHAIRMAN. I don't know whether we have sufficient funds to cover that or not.

Senator PINE. I refer to the report of Advisors on Irrigation on Indian Reservations made by Porter J. Preston and two other engineers in pursuance to request of the Secretary of the Interior, dated June 1928.

The CHAIRMAN. It is ordered that the said report of Advisors on Irrigation on Indian Reservations dated June, 1928, be made a part of this hearing and printed.

REPORT OF ADVISERS ON IRRIGATION ON INDIAN RESERVATIONS

(By Porter J. Preston and Charles A. Engle)

JUNE 8, 1928.

Hon. HUBERT WORK,
Secretary of the Interior.

SIR: In compliance with instructions contained in your letter of March 15, 1927, the engineers designated by you to make a survey of the irrigation activities of the Bureau of Indian Affairs respectfully submit herewith their report.

The field work involved in this investigation was carried on in connection with a survey of certain projects of the Bureau of Reclamation and was begun March 21, 1927, and completed September 16, 1927. The report on the Bureau of Reclamation projects was completed and submitted November 29, 1927, when the preparation of this report on the Indian Bureau projects was begun.

The lamented death of Mr. Ray P. Teele on August 31, 1927, deprived us of his assistance and counsel in preparing the final report. However, the filed work, with the exception of that on one reservation, had at that time been completed, and the general conclusions respecting many of the various problems had been formulated, so that the report to a considerable extent reflects his views as well as those of the other advisers.

We desire to express to you our appreciation of the honor you have conferred upon us by this assignment, and also to thank you for your friendly advice and wise counsel without which the preparation of this report would have been impossible.

We wish also to express our gratitude to the various officials and employees of the Indian Bureau who have in any way assisted in the preparation of the report.

Very respectfully,

PORTER J. PRESTON,
Engineer, Bureau of Reclamation.
C. A. ENGLE,
Supervising Engineer, Bureau of Indian Affairs.

IRRIGATION ON INDIAN RESERVATIONS

RECOMMENDATIONS

The following are the general recommendations applicable to the Indian irrigation work upon all projects. The specific recommendations for each of the various projects are included in the project reports contained in Volumes II and III of this report.

1. *Legislative enactments.*—It is recommended that all legislative enactments pertaining to Indian irrigation in general, as well as those relating to specific projects be compiled, arranged, indexed, and abstracted or digested for easy reference; and that this compilation should be printed and kept up to date for the benefit of the officials as well as of others interested.

2. *Indian Office regulations.*—That, (as the Indian Office regulations are practically obsolete and have been so often modified or amended by a large number of circular letters and bulletins, many of which are conflicting and confusing, and as the resulting uncertainty as to procedure to be followed often causes delays and mistakes), the regulations should be completely revised and brought up to date, and printed and distributed, so that employees may familiarize themselves with what is required of them.

3. *Rules and regulations for project operation and maintenance.*—That (as the Indian Irrigation Service has never formulated any general rules and regulations for the operation and maintenance of the projects, and as there is in consequence a total absence of uniformity and system in the way the work is carried out on the various projects with much resultant confusion), a manual including complete rules and regulations as to operation and maintenance should be prepared, printed and distributed.

4. *Indian claims.*—It is suggested (as the claims that many Indian tribes are urging against the Government for various real or alleged wrongs, principally the dispossession of land, are frequently a fruitful cause of indolence and discontent, as well as expense to them in the payment of attorneys, and as it is rumored that in some instances such claims are being agitated by attorneys and their Indian friends principally as an excuse for collecting contributions from Indians), that it would be desirable to appoint a committee of nationally known attorneys of recognized integrity and ability to investigate and pass upon such claims.

5. *Project histories.*—That complete project histories, conforming so far as possible to a uniform outline as to order and subject matter and containing a bibliography with digest or synopsis of all important reports relating thereto, be prepared for each of the Indian irrigation projects by the project or supervising engineer.

6. That after these project histories are prepared, they be brought up to date each year by the project annual report.

7. *Reports, monthly and annual.*—That the Indian irrigation service adopt an outline, uniform as to order and content for the preparation of both monthly and annual reports, and insist that reports be carefully prepared in conformity to the outline and directions.

8. That greater care be insisted upon in the collection and compilation of the irrigation project data submitted in reports and justifications (so that the data may be complete and reasonably accurate and consistent), and to this end it is recommended:

9. That on occasions, crop surveys of the lands operated by Indians, by lessees, and by non-Indian owners on the various projects, be made by engineers or surveyors not theretofore connected with the projects surveyed.

10. *Crop survey.*—It is recommended that once annually in the future there be made, reported, and certified by the project engineer of each project a reasonably accurate crop survey showing on appropriate forms information heretofore specifically requested by the congressional subcommittee, as indicated in the following quotation from the hearings:

"It is necessary for the purposes in view to have the fullest information obtainable as to the exact financial status of each and every Indian irrigation project. It is necessary to have the acreage under constructed works, acreage for which sufficient water supply is available, acreage under irrigation, the ownership of the acreage on the project, ownership of the acreage under irrigated works, and the ownership of the acreage actually irrigated. As to the lands under irrigation we should know whether such lands are cultivated or whether they are used for pasturage or wild-hay crops and whether they are being used by the Indians, by white owners, or by lessees. We should also know the total construction cost, the date of completion, the amount of construction cost repaid by the Indians, by lessees, and by white landowners, and the same information with respect to the operation and maintenance costs of the project."

And in addition thereto: Acreage, ownership, and status of land in project as contemplated, as Indian owned not leased; Indian owned and leased; and white owned; acreage, ownership, and status of project lands actually utilized; and acreage, average yields, and average returns of crops grown by Indians, by lessees, and by white owners.

11. *Promotion of cordial relations.*—That on all projects where there is a desire for it, annual operation and maintenance financial statements, showing all the principal items of expenditures and receipts, be made public at the close of each calendar year, or at the time of making assessments for the ensuing year.

12. That the formation of water users associations be encouraged on the various projects, and that the project management attend the meetings of such associations for the discussion of problems and complaints, and the exchange of views.

13. *Better roads.*—That, as good roads are essential to the development of any community, an effort be made to secure appropriations for the building and improvement of roads on the various reservations.

14. *Employment and salaries.*—That there be periodic transfers of employees from the field to the Washington office and vice versa, so that office employees may have a wider knowledge of field conditions.

15. That salaries in the Indian Service be placed on a par with those paid in other branches of the Government service. As a matter of fact, the salaries in the Indian Service should be higher, because of the unsatisfactory conditions incident to employment in the field, such as long hours, isolation, undesirable housing conditions, association with a primitive people, and constant exposure to tuberculosis and trachoma, which are especially prevalent among many Indians.

16. *Employment of ditch riders.*—That the plan adopted by the Bureau of Reclamation, and already practiced on some of the Indian irrigation projects, of employing ditch riders only during the irrigation season, be universally adopted on all projects.

17. *Instruction in agriculture for Indians.*—That, as the present system of agricultural instruction has not been productive of satisfactory results, principally because of the inadequate training and experience of many of the farmers and the fact that they are often loaded down with other duties, men of the type and having the qualifications of the county agents now regularly employed throughout agricultural communities of our own race be employed to instruct, and to interest the Indians in farming and that they devote their entire time to this work. Men of this type will demand salaries two or three times the salaries now being paid, but we believe it will be a measure of economy to secure them.

18. That a chief supervisor of agriculture to have supervision and direction of all agricultural activities and instruction among the Indians be appointed. In our opinion the man for this work should be of the type and have the qualifications of the average agricultural college president, or dean of agriculture in our agricultural colleges.

19. *Allotments.*—That as the allotting system heretofore practiced is unsuitable for irrigation projects and results in the Indians receiving much more land than they can beneficially use and thus encourages leasing, with the result that many Indians are living in indolence and dissipation from lease proceeds, the size of allotments should be restricted to approximately the acreage that the average family can use.

20. That in future allotments on irrigation projects be made under the supervision of the Indian Irrigation Service.

21. *Sales of Indian lands.*—That no sales of Indian lands be made without provision for collection from the purchaser of all irrigation charges and penalties due or to be come due on such lands.

22. That in sales of Indian land having accrued irrigation charges against it, the total irrigation charge, both accrued and unaccrued, be distributed over a term of years equal to the regularly established repayment period for the project wherein such land is located, and payment of such charges to be made by the purchaser.

23. That a record of all sales of Indian irrigable land be kept in the files of the project offices.

24. That all purchasers of Indian irrigable land be required to pay the annual assessments of construction and of operation and maintenance costs.

25. That if it be deemed inadvisable or impossible to withhold lease proceeds from Indians in an effort to promote industry, consideration be given to the proposal so grant fee patents to such lands as the Indians can not beneficially use, with the exception of 40 or 80 acres for each family, with a view to the disposal of such surplus lands to white purchasers so as to bring it into use and protect the water right, as well as to secure the irrigation charges.

26. *Water supply.*—That for each of the active projects of the Indian Bureau not yet completed there be initiated at an early date a most thorough and searching investigation of the water supply, the work to be done by a thoroughly competent and well qualified hydrographic engineer of long experience, not theretofore connected with the project, and all work to be done under the general supervision of a board of not less than three well-qualified engineers who shall prepare a report with recommendations.

27. That pending an accurate and reliable determination of the available water supply for each project, no further extensions to any project be made.

28. That after the determination of the water supply available for each project, and a determination of the water requirement of the land, all projects be reduced to the acreage for which there is a safe and dependable water supply, by excluding the less productive and less desirable lands, on the basis of a detailed soil survey and classification to be made by a soil expert of the Department of Agriculture.

29. *Water rights.*—That in all cases where the same can be done without jeopardizing the rights of the Indians, the laws of the States in which the Indian reservations are situated be compiled with in the acquisition and the protection of water rights. With respect to some of the reservations, this is already required by specific law.

30. That the principle promulgated in the Winters decision be invoked and enforced with respect to all those reservations where necessary to secure an adequate water supply for Indian lands; but that in all cases where the application of this principle would result in the loss of water rights regularly acquired by appropriation and beneficial use, and in consequence considered valid under State laws, the Government should provide an adequate water supply for the Indians in question, either by purchase of valid rights, or the construction of storage reservoirs for the impounding of flood or surplus waters, such purchase of rights or storage reservoir construction to be paid for out of gratuity appropriations. Any other course, in our opinion, would be penalizing the rights of private citizens for the failure of the Government to properly protect the Indian in his water rights.

31. That efforts be made to secure adequate appropriations for continuing and for greatly extending hydrographic work and investigations wherever necessary, as reliable and continuous stream-flow records over long periods of time are frequently invaluable in the development of irrigation projects, and the protection of water rights.

32. *Leasing of Indian lands.*—That all irrigable land which the Indians are unable to utilize be leased, with a view to its improvement and utilization in order to protect the water rights, and to derive some income from which to pay irrigation charges.

33. That, if not possible under existing legislation, legislation be secured to permit of leasing irrigable trust patent Indian land without the consent of the allottee, and to permit of leasing irrigable Indian tribal land without the consent of the tribe.

34. That legislation be secured to extend the lease period in exceptional cases to 20 years with the purpose of encouraging fruit development.

35. That, if not allowable under existing legislation, legislation be secured authorizing the Commissioner of Indian Affairs to withhold lease proceeds from allottees in all cases where such action may be deemed advisable for the encouragement of industry, and to apply any part of such proceeds to the repayment of any irrigation charges due, or to become due on the lands of such allottees, or in the discharge of any other legal obligations.

36. That each able-bodied Indian having no other occupation, be required to farm in a satisfactory manner such part of his land as in the judgment of the Commissioner of Indian Affairs he is able to operate, and that upon his failure to do this, any proceeds from that part of his land that is leased, may be withheld and applied to the payment of irrigation charges or for other purposes.

37. That on all leases of irrigable land, the lessee be required to pay the annual operation and maintenance assessment in advance.

38. That in making leases of irrigable lands, it be required that the leases shall be signed both by the superintendent of the reservation and the project manager or engineer, and that each shall retain a copy of all leases in his files.

39. That the project management or the supervising engineer make all collections of irrigation charges on leases of irrigable lands.

40. That in making improvement leases, the period of lease and all other conditions of the lease be made sufficiently desirable to attract successful farmers as lessees.

41. That if it be found impossible to withhold lease proceeds from Indians in an effort to promote industry, that consideration be given to issuing fee patents with a view to the sale of irrigable land in excess of a homestead for each Indian family.

42. That the lease terms on irrigable land be subject to the approval of the irrigation project management, and that no lease be valid unless signed by the project engineer.

43. *Irrigation cost assessments and collections on white-owned and Indians lands leased.*—That at the earliest opportunity there be made for each project a reasonably accurate determination of the irrigable productive acreage on which irrigation charges, both construction and operation and maintenance, may properly be assessed.

44. That assessments of irrigation charges be based on the acreage of productive land actually irrigable from the available water supply.

45. That operation and maintenance rates should be fixed annually, and based on the total estimated cost for the year, increased by any deficit from the previous year.

46. That in future, operation and maintenance assessments and collections be made in advance of the irrigation season to which they apply; and that they be based on, made, and reported by the calendar year, instead of by the fiscal year, as is being done in the case of some projects at this time, and that a uniform penalty rate for delinquency of one-half per cent per month or fraction thereof be adopted for all projects instead of the different rates now used.

47. That there be adopted by the Indian Bureau a system for making assessments and collections, with some uniformity as to time due, period for which made, basis and method of computation, penalty for delinquency, etc., so as to obviate the present confusion respecting these matters on various projects.

48. That extensions of time in individual cases should not be made, but that any concessions made to one farmer should be granted to all. Any other policy causes bitter criticism and makes it difficult or impossible to make collections.

49. That a close check should be kept in the Washington office on the assessments and collections made on the various projects.

50. That in order to properly make assessments and collections an accurate record of the ownership and status of project lands be kept for each project showing both for the area under constructed works, for the acreage irrigated, and for the acreage cultivated (if different from that irrigated), the acreage in white ownership, the acreage of Indian land leased, and the acreage of Indian land not leased.

51. That a firm policy of enforcing collections should be instituted and enforced and that legal action be taken with a view of making all collections now delinquent.

52. That in sales of Indian land having accrued charges against them the total construction charge, both accrued and unaccrued, be distributed over a term of years equal to the regularly established repayment period applicable to the project where such lands are located, to be paid by the purchaser.

53. That a penalty of one-half of 1 per cent per month or fraction thereof be charged on all delinquent construction assessments.

54. That there be included in the annual report for each project a detailed report of both construction and operation and maintenance assessments and collections, showing the acreage irrigable, ownership of acreage irrigable, as Indian owned and not leased, Indian owned and leased, white owned; assessment rates; total assessments; and total collections on Indian land not leased, Indian land leased, and white-owned lands.

55. That the due date for the payment of operation and maintenance annual assessments be March 1, or before the beginning of the irrigation season and that no water deliveries be made to any land in advance of the payment of all charges due thereon.

Irrigation cost assessments and collections on Indian lands not leased.—56. It is believed that (as the Indians in all but a few exceptional instances are unable to pay irrigation charges, either construction or operation and maintenance, and as attempts to make collections at the present stage of their development usually discourages them in their efforts at farming) collections should not be required from Indians who are farming small acreages.

57. That Indians farming their own land not in excess of 40 acres for each family shall not be required to pay annual operation and maintenance charges, except in such cases as in the discretion of the Commissioner of Indian Affairs or the superintendent they are financially able to pay such charges.

58. That for such lands farmed by Indians as described in the foregoing recommendation, the annual operation and maintenance charges be provided by congressional appropriation, such charges to be set up against the land, but not accrued; and the construction charge to become and stand as a lien against the land, which lien shall be inoperative as long as the land is in Indian ownership.

59. That if and when such land as described in the foregoing recommendation falls into white ownership, through purchase or otherwise, the white owner shall be required to pay the total irrigation charges due, and to become due, on such land within a period of time equal to the regularly established construction cost repayment period for the project in which such land is located.

60. That land owned and farmed by Indians in excess of the 40-acre homestead be assessed for all purposes the same as patent in fee land, whether it is leased or farmed by the Indian, and that the Indian owner be required to pay all charges in the same manner as a white land owner.

VALUATION SURVEYS

Surveys for determination of irrigable productive areas.—61. That (in view of the manner in which practically all of the Indian irrigation work has been done, as described in this report) the amount to be assessed against the lands of each project (other than the Fort Hall project or any other projects whereon the cost to be repaid has been fixed by law at considerably less than the actual replacement cost) as reimbursement of construction cost shall be established by a valuation survey to be made for determining the replacement cost of all necessary and useful features of the project.

62. That (in view of the fact that it is apparent that several projects have already been extended over larger areas than the available water supply will serve; that on many projects the area reported as "irrigable acreage under constructed works" includes considerable areas of nonirrigable and unproductive land; and that in many instances the acreage that can legally and reasonably be required to participate in the repayment of irrigation costs is not even approximately known) there be made for each of the major projects a survey for the determination of the irrigable productive acreage that can safely be served by the available water supply; for determining the limits or boundaries of the projetc; and for selecting the lands to be included in the project.

63. That the surveys recommended in the foregoing shall include a topographic survey (where such a survey has not already been made) and a soil survey and classification to be made by an expert detailed to the work from the Department of Agriculture.

64. That the survey for the determination of the irrigable productive acreage shall include an exhaustive investigation and study of the water supply and water requirements of the various soil types.

65. That the valuation survey herein recommended be made in connection with the survey for the determination of the irrigable productive acreage and the limitation of the projects the work to be done by or under the direction of an irrigation engineer of not less than 15 years' experience to be detailed for this purpose from the Bureau of Reclamation, and who shall upon conclusion of the work on each project prepare a comprehensive report, including the report of the Department of Agriculture soil expert on the soil survey and classification.

66. That upon completion of the surveys and reports recommended in the foregoing each project shall be inspected and the reports shall be examined and passed upon by a board of three consulting engineers, who shall be men of distinction in their profession.

67. That the cost of the surveys and reports recommended in the foregoing be charged to the various projects as a part of the surveys and investigations incident to construction.

68. That for accomplishing the work recommended in the foregoing there be appropriated for each project, to remain available so long as needed, an amount equal to $1 per acre for the estimated ultimate irrigable acreage as now reported, except on those projects where topographic surveys have already been made, the amount shall be at the rate of 50 cents per acre.

69. That pending completion of the work suggested in the foregoing recommendations no extensions or extensive permanent improvements be made on any project, unless specifically approved and recommended by a board of three eminent consulting engineers.

Authorization of new projects or project extensions.—

70. That new projects or extensions of existing projects be authorized only after full information has been secured concerning the water supply, engineering features, soil, including a complete soil survey and classification, climate, transportation, markets, land prices, probable acre cost of development, and other factors upon which the success of the project must depend; and all data shall have been reviewed and the proposed project examined and reported upon by a board of consulting engineers.

White-Owned Lands in Indian Projects.—70½. That no Indian irrigation project shall be hereafter authorized until all privately owned land in excess of 160 acres for each owner shall have been placed under control of the Government for sale at an approved price, with the provision that 50 per cent of any advance in price resulting from reclamation shall be applied on the payment of irrigation charges due or to become due.

Indian Irrigation Service Organization.—71. That the irrigation work on the Yakima, Flathead, Wind River, Fort Hall, Crow, Uintah, and Gila River Reservations be transferred to the Bureau of Reclamation

72. That the work on all other Indian Reservations be continued by the Indian irrigation service.

73. That the Indian irrigation service be completely reorganized by (a) definitely fixing in one person who should be an engineer, under the Commissioner of Indian Affairs the responsibility for the direction of and the proper conduct of the work, so as to eliminate the confusion incident to a double-headed organization as at present; (b) establishing the office of the Chief Engineer at some western point, preferably Denver, so that he may be in close touch with the work; (c) providing the Chief Engineer with an adequate number of assistants, both engineering, legal, and clerical, to properly attend to the work; (d) abolishing the offices of the supervising engineers; (e) having the designing for all Indian projects done by the designing division of the Bureau of Reclamation; (f) having all legal work in connection with all Indian projects done by the legal section of the Bureau of Reclamation; (g) having all preliminary investigations for the determination of the feasibility of proposed projects done by the Bureau of Reclamation; (h) making the salaries of all employees in the Indian Irrigation Service commensurate with those paid for similar duties in the Bureau of Reclamation or other branches of the Government service.

If recommendation No. 71 is not adopted, or necessary legislation for placing it in operation is not enacted, it is recommended that all Indian irrigation work be continued by the Indian irrigation service reorganized as proposed in recommendation No. 73, in which case it is further recommended.

74. That the accounts and water users' ledgers be kept in the project offices for the seven projects named in recommendation No. 71, and that collections be made by the project management, the chief clerk being a disbursing agent.

75. That in any event, whether or not recommendation No. 71 is adopted, all accounting and disbursing for the irrigation projects not named in recom-

mendation No. 71 be done by the chief clerk and disbursing agent of the Indian reservation agency.

INTRODUCTION

Many of the Indian reservations are in the arid West where the land is unproductive unless irrigated. It has therefore been necessary for the Government in carrying out its policy of making the Indian a self-supporting citizen to construct and operate irrigation projects.

The reclamation of arid land was first undertaken by the Federal Government in 1867 (35 years before the enactment of the general reclamation act), and was authorized by a congressional appropriation of $50,000 for collecting and locating the Indians of the lower Colorado River and its tributaries on the Colorado River Reservation in Arizona and for constructing an irrigation canal to enable them to become self-supporting by agriculture. After an expenditure of about $76,000 this early project on the Colorado River was abandoned in 1876, but within the next few years, particularly subsequent to 1884, many other projects were initiated.

There are now about 150 irrigation projects on the various Indian reservations of the West. These projects range in size from tracts of a few acres to such projects as the Yakima Reservation, Wash., with a contemplated irrigable area of 183,000 acres, of which about 120,000 acres are now provided with irrigation facilities and about 89,000 are being irrigated.

Briefly summarizing the work and its general results, an area of 692,057 acres, as reported by the Indian Bureau, has been provided with irrigation facilities at a cost to June 30, 1927, of $27,140,782.62 for construction, and $8,827,143.10 for operation and maintenance of the irrigation systems. Thus the total expenditure for irrigation on Indian reservations for the 60-year period 1867 to 1927 was $35,967,925.72.

The total expenditure by the Government for the support and civilization of Indians during the same 60-year period (but not including the expenditures of the Army incident to Indian wars) as reported by the Indian Bureau was approximately $500,000,000.

Ownership of land.—Of the 692,057 acres now susceptible of irrigation on all Indian projects 484,050 acres, or approximately 70 per cent, belong to Indians, and the remaining 30 per cent to whites. Of the 1,450,021 acres estimated to be ultimately irrigable when all Indian projects are completed 1,136,267 acres, or 78 per cent, belong to Indians and the remainder to whites.

On the projects specially covered by this report Indians own 452,927 acres of land now provided with irrigation facilities, of which they irrigate 70,990 acres, or 16 per cent. Whites own 198,000 acres, of which they irrigate 131,427 acres, or 66 per cent; 107,231 acres of Indian land are farmed by lessees.

Acreage irrigated by Indians, lessees, and white owners.—Of the 692,057 acres reported as being provided with irrigation facilities on all Indian projects 362,018 acres, or 52 per cent, are now irrigated. Of the area now irrigated (362,018 acres) 117,189 acres, or 32 per cent, are irrigated by Indians; 131,402 acres, or 31 per cent, are irrigated by lessees (whites); and 131,427 acres, or 37 per cent, are irrigated by white owners, or a total of 244,829 acres, or 68 per cent, are irrigated by whites (lessees and owners).

On the projects that are specifically covered by this report, which are the larger projects and which include over 91 per cent of the acreage now provided with irrigation facilities, 306,643 acres were irrigated in 1927, of which Indians irrigated 70,990 acres, or 23 per cent; lessees, 107,231 acres, or 35 per cent, and white owners irrigated 128,422 acres, or 42 per cent. Whites (both lessees and owners) irrigated 235,635 acres, as compared to 70,990 acres irrigated by Indians.

Utilization of project lands by Indians.—It will be observed by reference to Table I of this report, that on many of the so-called Indian projects most of the farming (in some cases practically all of it) is being done by whites, either lessees or owners. On the Wapato project of the Yakima Reservation the total acreage irrigated is 77,938 acres, of which only 4,661 acres, or 6 per cent, are reported as being irrigated by Indians; 38,862 acres, or 50 per cent, being irrigated by lessees and 34,415 acres, or 44 per cent, by white owners. On the Blackfeet project, in an irrigated area of 7,149 acres, only 44 acres, or about six-tenths of 1 per cent, are irrigated by Indians. On the Crow Reservation project the Indians are irrigating 2,703 acres of the 22,892 acres irrigated. On the Flathead Reservation the Indians are irrigating 452 acres, or 1.3 per cent, of the 34,441 acres irrigated. On the Wind River Reservation, Indians irrigate 6,697 acres of the 21,491 acres irrigated. On the Fort Hall Reservation they irrigate 7,338 acres in a total of 27,055 acres; on the Uintah 15,243 in a total of 58,290 acres.

The Indians of the Uintah Reservation of Utah are doing more farming (15,243 acres) than the Indians of any other reservation. The Gila River or Pima Reservation of Arizona is second with 12,000 acres farmed by Indians. It is interesting to note that 40 per cent of all Indian farming done on the projects covered by this report is on the Uintah and Pima Reservations.

On many projects the acreage utilized by Indians is continually decreasing, while the acreage utilized by whites is increasing.

Crop production.—On the projects specifically covered by this report, Indian farmers during the season of 1927 farmed 70,990 acres, on which they produced crops having an estimated value of $1,500,000. This is an average crop value of approximately $21 per acre.

On the same projects lessees farmed 107,231 acres and white owners farmed 128,422 acres, or whites lessees and owners farmed 235,653 acres. On this acreage they produced crops having an estimated value fo $9,500,000. The average crop value or return secured by white farmers was approximately $40 per acre.

The average value of crops produced by Indians ranged from about $6 per acre on such projects as the Fort Belknap, Mont., and other northern projects where wild hay and wheat are grown, to $41 per acre on the Colorado River Reservation, Ariz., where the principal crop is cotton.

Farm income of Indians.—Many Indians, particularly those on the northern projects, are securing only trifling returns from their irrigable land. This is principally due to the fact that most of the land is not farmed but is used only for growing wild hay. On a few of these projects the climatic conditions are such as to make farming any crops other than hay extremely hazardous, and hence discouraging, particularly for an Indian.

On a few of the projects the income or annual crop return is so low as to make it a matter of speculation as to how the Indian exists. It can be explained only by the fact that some members of the family occasionally find outside employment, sell a few cattle, or some may receive rations. On some projects the farm income for those families actually engaged in farming is as low as $60 to $80 each or only $15 or $20 for each individual. In view of this it seems probable that undernourishment may be a principal cause of the unsatisfactory health conditions among Indians.

On the Colorado River Reservation, Ariz., the Uintah Reservation of Utah, and the Ahtanum Project of Washington, the farm income per individual of the Indian families actually engaged in farming ranges from $200 to $300 each.

Many projects incomplete.—As shown in Table I, included herewith, many of the Indian irrigation projects as contemplated are incomplete. They are being improved or extended from time to time as funds are made available.

The ultimate irrigable area, if and when all projects are completed as contemplated, is estimated at 1,450,021 acres; 692,057 acres, or 48 per cent of the estimated ultimate total, are reported as now provided with irrigation facilities.

Dividing the total irrigation cost to date, $35,967,925.72, by the acreage reported as being provided with irrigation facilities, 692,057 acres, gives as the average total irrigation cost to date approximately $52 per acre, of which the construction cost is about $40 per acre and the operation and maintenance cost about $12 per acre.

While it is true that the total cost to date, $35,967,925.72, includes the cost of some projects that have been abandoned and some others that will have to be abandoned and it therefore subject to reduction by the cost of such projects, it is also true that the acreage now reported as "irrigable from constructed works" includes in the aggregate a large acreage or nonirrigable and unproductive land and land for which there is not an adequate water supply, so that the total irrigable acreage will be very materially reduced, and the acre cost thus increased.

The estimated total construction cost of all Indian projects when completed is given by the Indian Bureau as $56,014,255.54. The irrigable acreage with all projects completed is estimated at 1,450,021, so that the estimated construction cost when all projects are completed is approximately $40 per acre or the same as the acre construction cost of the acreage now reported as irrigable.

It will be noted that whereas the total expenditure to date for the construction of irrigation systems on Indian reservations is $27,140,782.62, a further expenditure of approximately $29,000,000 is contemplated in the completion of existing projects and the construction of new ones.

Construction cost and collections.—For construction of irrigation works on all Indian irrigation projects, there was expended to June 30, 1927, a total of $27,140,-782.62. Of this amount, $979,859.79, or 3.5 per cent, had been collected.

There was no general legislation specifically authorizing and requiring collection of construction charges prior to the act of February 14, 1920 (41 Stat. 408). As a matter of fact, until the enactment of the law of August 1, 1914, all appropriations for Indian irrigation work (except on certain reservations where reimbursement was specifically provided for by law) were considered as gratuities for the benefit of the Indians in the same manner as other large appropriations made annually for their support and civilization. The result of the act of August 1, 1914, was that about $3,000,000, expended previously to that time and until then considered a gratuity, was made a reimbursable charge. The consensus of opinion seems to be that it can not legally be collected because of the retroactive feature of the law. In only a few instances where Indian land is leased are Indians being required to pay construction charges. In most cases Indians are unable to pay construction charges, and in many instances they are exempted from such charges by law, the construction charge being a lien on the land, but the lien being inoperative as long as the land is in Indian ownership. In some instances, as the Fort Hall project of Idaho, legislation is such that only a part of the construction cost is collectible, even from whites, who have acquired Indian lands either by homestead or by purchase.

On several projects large areas of Indian land have gone into white ownership through Government sales of Indian lands or sales made by fee patent Indians. The irrigation charges (both construction and operation and maintenance) outstanding against such lands were not collected at the time of sale nor was any provision made in the contract of sale for collecting from the purchaser or his assignees. We have been unable to secure any reliable data as to the acreage thus sold except on two projects. The reservation officials keep no record of sales made by fee patent Indians. The Government will, of course, be unable to collect any part of the irrigation charges outstanding against the above-described lands. In one instance legal action was brought in the Federal court for the collection of such charges outstanding against lands of the Crow Reservation which are now in white ownership, but this effort at collection failed. In the case of the Wind River Reservation both the Attorney General and the Solicitor for the Interior Department have rendered opinions to the effect that collections can not now be legally made. From the data at hand, which, however, is meager and unreliable, it is considered that the Government will sustain a loss of about $2,000,000 by reason of its inability to make collections on these lands now in white ownership.

The construction costs and collections for the various projects are given in Table II of this report.

Operation and maintenance costs and collections.—The total cost for operation and maintenance of Indian irrigation projects to June 30, 1927, was $8,827,143.10. Of this amount there was collected to June 30, 1927, a total of $2,638,311.33, or 29.9 per cent.

There was no general legislation authorizing and requiring the collection of operation and maintenance charges prior to the act of August, 1 1914. In most instances Indians are unable to pay operation and maintenance charges except where their land is leased. In some instances Indians are exempted by law from the payment of operation and maintenance charges, and in at least one case, the Fort Hall project, even lessees are exempted by law from the payment of such charges for a period not exceeding three years. On several projects large areas of Indian land have passed into white ownership, and collection of the operation and maintenance charges outstanding against such lands was not made at the time of sale nor was there any provision made in the sale contract to collect such charges from the purchasers.

It will be noted by reference to Table II that a total of approximately $5,661,000 of the operation and maintenance cost is unassessed. It is not considered probable that any of this amount ever can be collected.

In addition to the foregoing probable losses, totaling about $10,000,000, there will be the losses incurred in the construction of a few projects that will have to be abandoned as failures.

Proposed abandonment of Fort Peck, Blackfeet, and Tongue River projects.—Three projects, the Fort Peck, Blackfeet, and Northern Cheyenne or Tongue River, are considered as hopeless, and recommendations are herein made looking to their abandonment. After a very careful study of all the available data relating to these projects, including a field examination, we are firmly convinced that any further attempts to rehabilitate and to operate and maintain these projects, or any one of them, can result only in increasing the loss that must be accepted and sustained by the Government. Adequate preliminary investigations and

studies to which every proposed project should be subjected, in our opinion would have condemned every one of these three projects as unfeasible.

These projects represent a net investment by the Government to June 30, 1927, of $2,380,109.40, being $941,029.17 for the Fort Peck project, $1,276,851.81 for the Blackfeet project, and $162,228.42 for the Northern Cheyenne or Tongue River development.

FORT PECK

It is our conclusion that the Fort Peck Reservation project presents a hopeless situation because of the inadequacy of the water supply. The streams supplying the various units of the project are small, and occasionally are dry at times during the irrigation season. There are no feasible storage sites. The storage already provided is inadequate, unsafe, and excessive in cost.

Although this project represents an expenditure to June 30, 1927, of $941,029.17, there was irrigated during the season of 1927 only 2,730 acres, and it is complained that the water supply was inadequate even for this small acreage, and the Government is confronted by a claim alleging damage to crops as the result of insufficient water.

For the period 1921 to 1927, inclusive, it cost the Government $91,711.71 to operate and maintain this project, and of this amount only $6,775.85, or about 7 per cent, was repaid by water users.

We are firmly convinced that there is no hope for the recovery of any pa.t of the Government's investment in this project, and that any further expenditures will simply be adding to the loss that eventually must be sustained.

BLACKFEET

On the Blackfeet project, which represents a net investment by the Government to June 30, 1927, of $1,276,851.81, only 45 acres were farmed by Indians in 1926.

The area now reported as irrigable from the canal system is 21,377 acres. Of this, 7,150 acres, or practically one-third, was irrigated in 1926; 45 acres by Indians and 7,105 acres by white lessees and owners. The Indians receive a rental of 50 cents an acre for their irrigable land, which is a small fraction of what it costs the Government to operate the project. The principal crop is wheat; the average yield for 1926, 13 bushels. During some seasons much of the project land is dry-farmed.

Salaries of regular project employees amount to $15,850 annually. For the three years, 1924, 1925, and 1926, the excess of running expenses over collections was $35,191.73.

We regard the project as hopeless, and believe that it should be abandoned.

TONGUE RIVER OR NORTHERN CHEYENNE PROJECT

As the irrigation development on this reservation, representing an expenditure of $162,228.42, has not resulted in any permanent benefit to the Indians, and as the Tongue River project has as a matter of fact been abandoned for several years, and as its rehabilitation is considered infeasible and impossible because of the alkalinity of the soil and the impossibility of maintaining the main canal, it is recommended that this development be permanently abandoned and its cost written off as a loss.

Indian projects that in reality are white projects—The evils of the allotting system.—Reference to Table I of this report shows that, based on the acreage of land being used, many of the so-called Indian irrigation projects are in reality white projects. The acreage farmed by Indins is small in comparison with that farmed by whites and is continually decreasing, and under present conditions will continue to decrease.

The continual decrease in the acreage farmed by Indians is the natural and lodical result of the leasing system, and the leasing system in turn is the inevitable result of the allotting system. As a result of the allotting system followed on many reservations, the average Indian family has much more land that they possibly can utilize. As a matter of fact, many Indian families have more land than the ordinary white family in the same community has or could beneficially use.

In nearly all instances, every Indian, regardless of age or sex, has received an allotment varying in size on the different reservations, from 10 acres or less, to 80 acres of irrigable land. The result is that each family may have from 50 to 400 acres of irrigable land. What can an Indian family or even a white family

do with 400 acres of irrigable land? One of the most fruitful causes of failure on irrigation projects, both Government and private (peopled by our own race), is large land holdings. The most successful irrigation farmers are those with relatively small farms of 20 to 60 acres in size. Another defect in the allotting system is that it is based on the assumption that it is possible to make of every Indian a farmer. This is no more possible or desirable among Indians than it is among people of our own race.

The natural result of the Indians being allotted so much land, coupled with the necessity of using the land either to perfect and hold the water rights or to derive some income from which to pay irrigation charges, or both, was the leasing system. The foregoing considerations were of course the principal ones that impelled the Indian Bureau to the leasing system. Occasionally, also, the allotments of incapacitated Indians are leased for their support, and this in fact is the reason for the leasing law.

Once leasing was begun, and the Indian saw the possibility of receiving without any effort on his part larger returns from his land than he himself is able to secure by his own labor, the leasing system naturally became very popular. As the Indian expresses it, "why should I try to farm my land when I can lease it to a white man and get more out of it than if I farmed it myself?"

The result of the leasing system as practiced on some reservations is that an increasingly large number of Indians are living in indolence and profligacy from their land rentals. It is a virtual return to the ration system; in fact it is far worse in its effects upon the Indian than the ration system, as it frequently gives them a relatively large income to be squandered in indolence and dissipation. This condition is worse on the Yakima than on any other reservation.

This situation presents an urgent problem. Unless it can be curbed, much of the welfare work already done among these Indians will be of no avail. In an instance of this kind the irrigation system, instead of being a benefit to the Indians, is a curse.

Two remedies suggest themselves for curing the evils growing out of the allotment to the Indians of more land than they can beneficially use: First, withhold the lease proceeds as a means of compelling all able-bodied Indians to support themselves by their own labor; and, second, grant fee patents for all lands except such an area for each family as is actually required to support a family, to be held under a trust patent issued to the head of the family, which would soon result in the sale to white of all surplus lands, or lands that the Indians themselves can not use. The success of the first suggestion is questionable, as an Indian deprived of his lease money would simply live with some of his relatives.

No real attempt to make farmers of the Indians.—It can not be said that there has been any serious and sustained effort on our part to make farmers of the Indians.

With a peculiar idea of economy we expend some millions of dollars in building an irrigation plant to enable Indians to support themselves by farming, and employ a man called a "farmer," but who in reality is a chore boy or field clerk, at a salary of $1,500 a year, to instruct the Indians how to use this intricate and complicated plant.

The Bureau of Reclamation, after an expenditure of many millions of dollars in building irrigation projects, learned that the building of dams and canals does not of itself create irrigated agriculture, but is only the first step in that direction. It is now realized that there must be strict selection of settlers as to their experience, health, and financial condition; that there must be technical assistance and advice, as well as financial assistance. If these things are necessary for the success of projects peopled by our own race, where people are farming from choice how much more necessary are they on Indian projects where it is expected to make every Indian a farmer.

Although the object in building irrigation projects was to enable the Indian to become self-supporting, it must be acknowledged that the methods adopted in some instances have brought about results directly the opposite of those intended. As an instance, we give him many times as much land as he can possibly use—more, in fact, than one of our own race could use. The result is that the land is leased and the Indian lives in idleness. For this the Indian should not be criticized. Would not many of our own race do likewise if each family had 300 or 400 acres of irrigable land?

Some defects in the organization and work of the Indian irrigation service.—As would naturally be expected, considering that much of the work was begun when but little was known of irrigation, that much of it has been done without engineering advice or supervision, that in many instances work was done largely

for the purpose of affording employment for Indians, that the work has been done largely as a welfare activity, that the organization having it in charge has always been inadequate, unsatisfactory conditions exist on many of the projects.

Projects and extensions of projects have been built without securing in advance the data necessary to determine their feasibility, such as a survey and classification of soils, determination of productive acreage that reasonably may be expected to contribute to defraying the cost of irrigation works, necessity for drainage, status of water rights, adequacy of water supply, and reasonably close approximation of cost.

On but few of the projects examined is there complete, definite, and reliable information as to the acreage of productive land that can be irrigated. In consequence the per acre construction cost to be collected from the landowners is not definitely known, and in many cases not even approximately known. As an instance, on one project fully one-fourth of the land is worthless as the result of seepage and alkali. Unless this unproductive land is reclaimed by drainage, or that part of the construction cost heretofore apportioned against it is written off, the construction charge on the productive land will be proportionately increased.

In some cases it seems apparent, as the result of overoptimism, coupled with a desire to demonstrate the feasibility of a project and thus bring about its construction, there has been a surrender on the part of the investigating engineer to the inherent human tendency to minimize difficulties and swell the irrigable acreage by the inclusion of lands that in all probability never can be profitably used. Until such areas are eliminated or suspended, the per acre cost is not known.

The present organization of the irrigation division—at least in the manner in which it is now organized—is believed to be entirely inadequate for properly and efficiently carrying on the work with which it is charged.

Among the principal objectionable features and deficiencies are these: (1) That it is a dual headed organization, there being a chief of irrigation division and a chief engineer, with duties of necessity largely overlapping and not clearly defined, which inevitably results in delays and confusion. (2) There is no designing engineer. Structures and works are designed either by temporary employees, who, in consequence of the inadequate salaries offered and the temporary nature of the employment, frequently are not properly qualified for the work, or they are designed by project or supervising engineers. The result is that there is no uniformity or standardization and that types of structures and methods of construction not in conformity with accepted and safe practice are frequently adopted and used. (3) There is inadequate inspection and supervision of both construction and operation and maintenance work. The chief engineer is at a great distance from the projects. He has no assistants. The so-called assistant chief engineer, so far as can be learned, has not performed the duties implied by the designation of his position for several years, but has been engaged as an engineer on construction in building dams and other structures on the Gila River Indian Reservation. (4) Aside from the chief of the irrigation division, who is an attorney, there is no legal organization to take care of the innumerable legal questions respecting lands, water rights, and other related questions that are continually presenting themselves in connection with every irrigation project. It is a well recognized fact that the attorney, versed in irrigation law and practice, is just as necessary as the engineer in the construction and operation of an irrigation project.

As the result of inadequate legal attention, the department is now confronted with questions and controversies of many years standing, demanding adjustment. Some of these, doubtless, can only be settled by legal action which might have been avoided by proper legal steps at the right time, which could have been taken by an attorney on the ground and acquainted with the conditions.

As some of the results of the present inadequate organization of the irrigation division of the Indian Bureau, especially the inadequate engineering and legal branches, the following are noted:

In some instances structures of unusual and untried types have been built at a cost considerably in excess of the cost of safe and conservative structures that have proven satisfactory on other projects under similar conditions.

Supposedly permanent concrete structures, built in locations where the ground is heavily impregnated with alkali, where, as well known, concrete is unsatisfactory, have disintegrated and have had to be replaced within 7 to 12 years.

In numerous instances, and particularly on some of the northern projects where efforts should be made to reduce construction costs to a minimum, elaborate and expensive concrete drop structures have been built on small canals and laterals, where, because of local conditions, no structures are needed. In one such case there are 11 such structures within 300 feet on one lateral. In our judgment none of them is necessary.

On some projects, and particularly on the Crow Reservation, a large force of ditch riders are retained on the pay roll through the entire year, though it is well known there are five or six months each winter when they can do practically no work. It is believed probable that $3,000 to $4,000 annually is thus being uselessly expended on this one project alone.

In some cases, particularly on the Crow and Uintah Reservations, Indian lands carrying a water right and embraced in irrigtaion projects constructed by the Government have been sold without collection and without any possibility of collection of the construction charges, so that the part of the irrigation cost apportioned to these lands will be a total loss.

We can see no consistency in the way in which the so-called Winters decision is being invoked on various Indian reservations. On the Walker River Reservation it is held the farmers on the upper stream must give up to the Indians the water they have been using for many years. On the Gila River Reservation the whites are left in undisturbed possession of the water, while it is proposed to encumber the Indian land $50 per acre to build a reservoir to replace the water taken by the whites.

Irrigation work as carried on by the Bureau of Indian Affairs is apparently considered as only an incident to the more important work and real object of the bureau—the civilization of the Indian. As a result, it does not receive the attention that it should.

The outstanding error in Indian irrigation activities.—In our opinion the most serious error of the Indian irrigation service is in continuing to make extensions to projects where there is a question as to the adequacy of the water supply. In the case of the Wind River and Crow Reservations, although it is admitted in reports on file in the Indian Office that the water supply has not always been adequate, and that storage will be necessary when the total acreage now under canal is being irrigated, yet it is admitted as doubtful whether there are any storage sites. Similar conditions exist on some of the other projects.

In our judgment several projects already have been extended over larger areas than can be supplied with water. In such cases individuals as well as the Government will of course sustain heavy losses. This is a matter that we believe should have immediate attention.

No further extensions should be made pending a most thorough investigation and study of all conditions affecting feasibility.

Table I, immediately following, shows the status of ownership of project lands as of June 30, 1927, for the various projects, and Table II is a summary of data relative to costs, collections, and assessments as of June 30, 1927.

TABLE I.—*Status of ownership of project lands as of June 30, 1927*

Project	Ownership of lands under ultimate irrigable area			Ownership of land under constructed ditches			Ownership of irrigated land under project			
	Indian	White	Total	Indian	White	Total	Indian owned	Indian-owned land leased	White-owned land	Total irrigated
Wapato—Yakima Reservation	80,200	39,800	120,000	61,000	39,000	100,000	4,661	38,862	34,415	77,938
Toppenish-Simcoe—Yakima Reservation	16,000	2,000	18,000	5,000	1,000	6,000	395	621	605	1,621
Satus—Yakima Reservation	35,200	4,800	40,000	6,566	4,000	10,566	340	3,054	1,585	4,979
Ahtanum—Yakima Reservation	4,290	710	5,000	4,290	710	5,000	854	2,992	710	4,556
Colville	6,500	1,500	8,000	3,300	200	3,500	216	238	29	483
Klamath	6,464	3,136	9,600	6,464	3,136	9,600	1,262	786	2,694	4,742
San Carlos—Pima Reservation	50,000	50,000	100,000	12,000	33,500	45,500	12,000			12,000
Colorado River	104,000		104,000	6,000		6,000	2,500	3,118		5,618
Southern Ute	14,579	2,621	17,200	14,579	2,621	17,200	3,181	1,373	1,949	6,503
Uintah	60,010	27,581	87,591	60,000	27,581	87,581	15,243	24,819	18,228	58,290
Fort Hall	[1] 44,203	15,979	60,182	34,533	15,797	50,330	7,338	6,408	13,309	27,055
Wind River	58,986	19,514	78,500	41,108	15,343	56,451	6,697	1,944	12,855	21,491
Blackfeet	60,017	20,483	80,500	7,736	13,601	21,337	44	3,981	3,124	7,149
Fort Peck	45,044	2,763	47,807	20,031	2,763	22,794	1,503	1,034		2,537
Flathead	[2] 23,737	88,763	112,500	88,765	23,735	112,500	452	1,836	32,153	34,441
Fort Belknap	24,206	1,079	25,285	14,975	2,000	16,975	9,803	1,884	838	12,525
Crow	43,163	13,000	56,163	43,000	13,000	56,000	2,703	14,281	5,908	22,892
Walker River	10,255	25	10,280	3,580	20	3,600	1,803		20	1,823
Miscellaneous (estimated)	449,413	20,000	469,413	51,123	10,000	61,123	46,199	6,171	3,005	55,375
Total	1,136,267	313,754	1,450,021	484,050	208,007	692,057	117,189	113,402	131,427	362,018

[1] 2,641 acres of this area homesteaded.
[2] 44,000 acres of this area homesteaded.

TABLE II.—*Costs, collections, and assessments as of June 30, 1927*

Projects	Total ultimate irrigable area	Total estimated cost when completed	Total construction cost to June 30,1927	Per acre cost of construction based on total area irrigable and costs as of June 30, 1927	Total construction repayment assessments	Total construction repayment collections	Total operation and maintenance cost to June 30, 1927	Per acre operation and maintenance costs based on total irrigable area and costs as of June 30, 1927	Total operation and maintenance assessments to June 30, 1927	Total operation and maintenance collections to June 30, 1927	Unpaid per acre operation and maintenance costs on irrigable area
Wapato—Yakima Reservation	120,000	$5,149,595.00	$3,291,318.00	$32.91	$764,728.55	$737,098.59	$1,136,240.04	$11.36	$1,051,223.37	$1,045,611.99	$0.90
Toppenish-Simcoe—Yakima Reservation	18,000	1,893,803.00	143,823.30	23.97			19,298.39	3.22	1,756.75	1,756.75	2.92
Satus—Yakima Reservation	40,000	2,136,025.00	169,611.11	16.05			14,705.90	1.39	5,687.16	5,867.16	.85
Ahtanum—Yakima Reservation	5,000	368,495.00	94,241.54	18.85	4,865.90	833.60	74,115.80	14.82	70,405.04	69,002.11	1.00
Colville	8,000	258,377.00	54,377.19	15.53	23,429.00	12.50	34,279.56	9.79	2,196.79	874.52	9.54
Klamath	9,600	499,994.00	219,994.23	22.91	42,213.65	6,157.20	65,998.00	6.87	20,356.50	6,686.56	6.18
San Carlos—Pima Reservation	100,000	7,111,156.00	3,635,674.07	79.90			85,929.16	1.89			1.89
Colorado River	104,000	7,850,700.00	615,699.74	102.67	137,349.00	14,341.06	408,355.25	68.06	96,197.66	95,309.31	52.18
Southern Ute	17,200	233,911.00	206,911.40	12.02	66,478.95	498.42	92,450.70	5.38	7,441.15	4,725.23	5.10
Uintah	87,591	1,521,896.00	913,896.86	10.43	1,522.88	1,522.88	1,023,744.94	11.69	346,503.38	274,901.96	[1] 5.49
Fort Hall	60,000	1,927,189.00	1,767,189.52	35.11	73,938.27	73,620.90	814,761.05	16.18	336,301.70	332,279.03	[1] 9.59
Wind River	78,500	2,614,187.00	1,451,429.70	25.71	168,957.29	12,802.01	798,339.12	14.14	470,800.76	119,676.30	[2] 12.02
Blackfeet	80,500	3,361,062.00	1,094,653.89	51.30	64,008.93	14,412.73	256,380.17	12.01	80,162.37	59,769.52	[1] 9.21
Fort Peck	47,807	803,876.00	803,876.82	35.26	56,760.64	5,904.98	137,152.35	6.02	14,202.46	12,196.96	5.48
Flathead	112,500	7,692,715.00	5,177,715.32	46.02	312,684.41	74,788.90	774,855.56	6.89	413,609.74	316,404.95	[1] 4.08
Fort Belknap	25,285	667,864.00	345,864.76	20.37			241,928.42	14.25	3,049.05	1,479.35	[2] 14.17
Crow	56,163	2,593,648.00	1,978,934.99	35.33	450,357.27	4,789.46	1,011,284.58	18.06	596,096.02	249,241.12	[2] 13.61
Walker River	10,280	547,352.00	137,352.64	38.15			64,808.94	18.00			18.00
Tongue River			132,817.50				29,410.92				29.41
Miscellaneous projects	489,595	8,782,410.64	4,905,400.04		1,835,128.10	32,776.56	1,743,104.25		50,000.00	42,528.51	
Total	1,450,021	56,014,255.64	27,140,782.62		4,002,422.84	979,559.79	8,827,143.10		3,566,489.90	2,638,311.33	

[1] 6 per cent penalty on delinquent assessments.
[2] 7 per cent penalty on delinquent assessments.

GENERAL SUMMARY

Origin and extent of the survey.—By instructions contained in a letter of March 15, 1927, the Secretary of the Interior directed Messrs. Ray P. Teele, agricultural economist of the Department of Agriculture, Porter J. Preston, engineer of the Bureau of Reclamation, and Charles A. Engle, supervising engineer of the Indian irrigation service, to make a survey and prepare a report concerning irrigation methods and practices, construction costs, and collections, operation and maintenance costs and returns, failure to make repayments to the Government of the capital invested, utilization being made of irrigated lands by Indians, by purchasers, and by lessees of Indian lands, settlement and utilization of former Indian lands by homesteaders, water supply, soil fertility, availability of markets, and other questions affecting the feasibility of reclaiming Indian lands, with respect to the following Indian irrigation projects: Wapato, Teppenish-Simcoe, Satus, and Ahtanum of the Yakima Reservation; Colville Reservation projects; Klamath; Florence-Casa Grande, San Carlos project; Colorado River; Southern Ute; Uintah; Fort Hall; Wind River; Blackfeet; Fort Peck; Flathead; Fort Belknap; Crow, and Walker River Reservation projects, and Northern Cheyenne or Tongue River Reservations. Later, it was directed that the Carson Sinks project should also be included in the study and report.

Later we were directed to make an economic survey of certain projects of the Bureau of Reclamation, whereon extension of time in making repayments had been requested. The field work involved in the survey of both the Indian and reclamation projects was begun March 23, at Florence, Ariz., and was completed September 17, after which the preparation of the reports was begun. The report on the Bureau of Reclamation projects was completed November 29, when work was begun on the report concerning the Indian irrigation projects. During the time they have been engaged on this work, Messrs. Preston and Engle have kept in touch with, and directed in a general way, the regular work. with which each is respectively charged, and for this purpose have occasionally visited their respective jurisdictions.

Plan and outline of report.—This report consists of three volumes: Volume I, treating of those conditions and problems that are general in their nature, and more or less applicable to all projects, including a brief general summary of the entire report; and Volume II and III containing the special reports on each of the projects under consideration.

Volume I contains the following sections:

1. General Recommendations and Introduction.
2. General Summary of the Report.
3. Origin and Purpose of the Survey.
4. General Plan and Content of the Report.
5. The Indian Problem.
6. The Indian Bureau and Its Organization.
7. The Indian Irrigation Service and Its Organization.
8. Indian Irrigation Activities, History, and Legislation.
9. Water Rights and Water Supply.
10. Land and Allotments.
11. The Indian as a Farmer.
12. Leasing of Indian Lands.
13. Acquisition of Indian Project Lands by Whites.
14. The Question of Reimbursement of Irrigation Charges.
15. Estimates, Costs, and Collections.
16. Incomplete and Unreliable Data in Justifications for Appropriations.
17. Miscellaneous.

The Indian problem.—The Indian problem, which, reduced to its simplest terms, is "What shall be done with the Indian?" first presented itself with the first meeting of the Caucausian and red races. The Indian problem of to-day is admittedly to make of the Indian an intelligent, self-supporting, and law-abiding citizen of our country. In view of his present condition, the problem consists essentially in improving his health, educating him, and inculcating in him habits of industry, thrift, and economy.

Some difficulties of the problem.—In some instances the Indian problem is greatly complicated, if not made impossible of solution, by the fact that changing economic conditions brought about by the settlement and development of the country have relieved the Indian of the necessity of working. He is living from the rentals of his property or on other unearned money. Under such conditions it seems impossible to teach him the habits necessary to good citizenship, such

as industry, economy, thrift, and temperance. For many of those Indians, such as the Yakimas, who are living from their land rentals, and the Klamaths, who are living from their timber sales, there seems to be little hope for the future. The habits of indolence, improvidence, and profligacy are growing stronger day by day. This class of Indians—the idle rich—presents a difficult and critical problem among the Indians; more so than the same class presents among our own race. Some day their tribal funds will be exhausted; they will have received fee, patents, sold their land, and squandered the proceeds; and then many of them, unable or unwilling to support themselves, will again come back on the bounty of the Federal or State Government.

The Indian Bureau—Its organization and activities.—The organization created by our Government for the purpose of working out a solution of the Indian problem—that is making intelligent, law-abiding, and self-supporting citizens of the Indians—is the Bureau of Indian Affairs.

The organization of the office of the Bureau of Indian Affairs located in the Interior Department building, at Washington, D. C., consists of four major divisions: Land, Administrative, Finance, and Purchase; and also Medical, Forestry, and Irrigation divisions. Every question of administration relating to Indians comes to the Indian Office for consideration. These questions relate to land, health, education, industrial activities, irrigation, purchase of supplies, handling the accounts of various field officials, and other activites.

Indian population and property.—There are approximately 350,000 Indians in the United States, and these are included in 193 different tribes or bands, speaking some 60 different languages. There are about 200 Indian reservations, ranging in size from tiny plots of a few acres to extensive reservations such as the Navajo Reservation in Arizona and New Mexico, having an area of about 8,000,000 acres.

The Indians own approximately 71,000,000 acres of land, of which about 39,000,000 acres have been allotted to individuals. The total value of Indian property is about one and one-half billion dollars.

Number of employees.—There are 119 field-offices or jurisdictions. There are regularly about 200 employees in the Washington office and about 4,800 in the field.

Appropriations for Indian welfare work.—For some years past the annual appropriations from the United States Treasury for Indian purposes have ranged from twelve to fourteen million dollars. Usually about one million of this is for fulfilling treaty obligations, approximately two million is reimbursable, and the remainder, nine or ten million dollars annually, is a gratuity appropriation; that is, one not subject to repayment. About $6,000,000 annually is expended for educational work.

Since 1871, Congress has appropriated approximately $500,000,000 for the support, civilization, and education of the Indians.

Extremes in civilization and economic conditions.—The Commissioner of Indian Affairs has direct, and to a large extent almost personal supervision over the affairs of all restricted Indians. These live under the widest possible variety of conditions and represent every degree of civilization ranging from pagan barbarism to men and women of the highest type of culture and refinement. As to their financial condition, they range from beggars to millionaires.

Indian irrigation service organization.—It was not until 1906, after an expenditure of $830,000, from the general fund "Irrigation, Indian Reservations," and about that much more from special project appropriations, for irrigation work, that provision was made for a chief irrigation engineer at the modest salary of $3,500.

The Indian irrigation service, or more correctly, the irrigation division of the Bureau of Indian Affairs, as now organized, is one of nine divisions into which the Indian Bureau is divided for administrative purposes. The organization in the Washington office consists of a chief of division, a chief engineer, field cost accountant, two clerks, and one stenographer. The chief of the division is an attorney, and in fact the only attorney regularly employed by the Indian Bureau who is familiar with irrigation law.

Since 1912, the arid west has been divided for administrative purposes into five irrigation districts, each in charge of a supervising engineer. Each supervising engineer maintains an office with a small staff of assistants at a centrally located point in his district.

Organization inadequate for the work to be done.—It is found from a comparison of the Indian irrigation service organization with any other organization, either

Government or private, doing a similar class of work and comparable in magnitude, that the organization is entirely inadequate for properly carrying on the work it is attempting to do. An examination of conditions on many of the projects, and of the field and office records, makes the inadequacy and inefficiency of the organization still more apparent. Not infrequently, apparently as a result of inadequate or unqualified personnel and supervision, projects or extensions have been built without the necessary preliminary investigations to determine feasibility, including data as to water supply and irrigable and productive acreage. In several instances areas have been included in projects for which it is apparent the water supply is inadequate, and in some cases such lands have been sold to white purchasers, with the result that the Government will in all probability be faced with damage claims for failure to provide water.

A business of the magnitude here involved, and as diversified as it is, requires the services of the skilled and experienced engineer, the accountant, the able and experienced attorney, the cost keeper, and a sufficient number of clerical assistants in the Washington office and in the field to compile and to keep the proper data and to properly coordinate and manage the business.

Failure apparently on the part of the Indian Bureau to comprehend the importance, the magnitude, and the difficulties of the irrigation activities is the principal cause of the trouble, and is what might be expected as a result of the present system whereby this work is directed by a bureau primarily interested in education and welfare work, and hence considering irrigation as a relatively unimportant incident.

Lack of coordination and standardization in work.—The chief engineer, with headquarters at Washington, nominally is in charge of all the activities of the irrigation service. He maintains no engineering aides to assist him. Practically all the engineering work is done in the offices of the five supervising engineers. Due to the absence of an adequate engineering organization in the office of the chief engineer, the work performed by him is more in the nature of that of a consulting engineer. This has had the effect of building up the offices of the five supervising engineers into five independent organizations. Naturally, as a result of this system, there is little or no coordination and standardization in the work.

In order to secure uniformity and greater efficiency, it is deemed avdisable that a stronger central organization should be built up in the Indian irrigation service, and that the intermediate offices should be discontinued.

The attorney as necessary as the engineer.—Lawyers are as necessary to the construction of irrigation projects as engineers. Numerous legal questions are bound to arise in the development of an irrigation enterprise, and engineers require constant legal advice. Under the present system, questions relating to legal matters are taken up by correspondence with the Washington office, and frequently years elapse without any solution of the difficulties. It is impossible for an attorney sitting in the Washington office to have the same understanding of the relative effect local conditions may have upon a legal matter that might be obtained in a few hours on the ground. It is found that in one instance the adjustment of an irrigation claim has been pending since 1908 and is still undecided after 20 years. On another project operation and maintenance costs covering a number of years, and now amounting to $45,000, are involved without the Government being properly protected by a contract. To recover this amount will now involve a lawsuit with the prospect of losing a large part of the cost. All this could have been avoided by proper and adequate legal advice in drawing up a contract at the proper time. On the Crow, Wind River, and Uintah projects the Government will lose large sums of money spent in developing irrigation systems on lands purchased by whites, all of which could have been saved if the Indian irrigation service had required the purchasers to execute proper repayment contracts.

The Indian Service is dealing with water rights on reservations in the West valued at many millions of dollars. The lands to which these water rights are appurtenant are scattered over many States having different water laws which must be complied with to a greater or lesser extent. On one small reservation in southern California it is stated that the water rights are valued at $150,000 per second-foot.

INDIAN IRRIGATION ACTIVITIES—EARLY HISTORY AND LEGISLATION

Necessity for land reclamation by irrigation.—Many of the Indian reservations are in the arid regions of the west where without irrigation, land is unproductive and unsuited to sustain human life. As the wild animal life, on which the Indian in his primitive condition depended for food was driven out of the country before

the advancing tide of white settlement, the duty of caring for and feeding the Indians as well as protecting the settlers, devolved upon the Government. It naturally followed, that primarily as a war measure to protect the settlers and pioneers, and not so much from humanitarian or sentimental considerations, the reservation system with its necessary corollary, the ration system was adopted. To purchase their good behavior the Indians were fed and supported by the Government.

When first instituted, it was the thought of those having the matter in hand, that it would be necessary to feed the Indians only for a few years until they should be able to support themselves in the ways of the white man. It was soon found, however, that the civilizing process is a slow one, and that it would require much longer to bring about the desired results than was at first supposed. Two factors in particular interfered with the success of the plan. First, the Indian naturally showed little inclination to work as long as the Government would feed him, and if the rations were reduced for the purpose of causing him to put forth some effort in his own behalf, he either suffered from hunger or went on the war path. Second, even if the Indian showed some inclination to work, there was little or nothing in the way of gainful employment that he could do, or was fitted to do. The natural thing to do since the Indian had the land was to try to interest him in supporting himself from agriculture. Hence, in order to enable the Indian to engage in agricultural pursuits on those reservations within the arid region, the Bureau of Indian Affairs embarked on a program of irrigation development.

The Government's first attempt in arid land reclamation.—The first irrigation work undertaken by the Government was that on the Colorado River Indian Reservation in Arizona. This is not far from the Gila and Salt River Valleys in Arizona where irrigation was then being practiced by the Pima and other Indians, and had been practiced by their ancestors from prehistoric times. The Indians of the lower Colorado River Valley apparently had learned something of the benefits of irrigation from these ancient irrigators of the Gila and Salt River Valleys, and had themselves originated and when first found by white men were practicing, a rude form of irrigation adapted to the natural conditions under which they lived and similar to the practice of the Egyptians. As the usual annual overflow from the Colorado River receded, these Indians planted their crops on plots of ground that recently had been inundated. Such crops grew rapidly and usually matured without further irrigation or attention. Occasionally, however, the usual early summer flood of the Colorado River does not occur, and in consequence these Indians with their primitive method of agriculture could then produce no food, so that seasons of drought were followed by famine. It was to prevent these occasional famines among the Indians of the lower Colorado that the first irrigation system to be constructed by the Government was begun. The Government's first venture in the reclamation of arid land by irrigation was provided for by an appropriation carried in the act of Congress of March 2, 1867, "for the expense of collecting and locating the Colorado River Indians in Arizona on a reservation set apart for them, including the expenses of constructing a canal for irrigating said reservation, $50,000." This canal was finally completed after a manner; but after several unsuccessful attempts to operate and maintain it, it was abandoned in 1876.

No further appropriations were made for irrigation work for the benefit of Indians until for the fiscal year 1885 when a general appropriation of $50,000 was made to be used on various reservations in the discretion of the Secretary of the Interior "for the purposes of constructing irrigation ditches on Indian reservations and instructing Indians in farming in connection therewith." The next appropriation for similar work was one of $30,000 for the fiscal year 1892. Following this or beginning with the fiscal year 1893 Congress made annually a general appropriation under the caption "Irrigation Indian Reservations" for use on such reservations as were not provided for by specific appropriations.

These general appropriations were gradually increased from year to year, the appropriation for the fiscal year 1902 being $100,000; for 1905, $185,000; for 1906, $206,000; for 1909, $200,000; for 1911, $249,000; 1912, $314,000, and 1913, $325,000.

Reimbursement of construction costs—act of August 1, 1914.—In addition to these general appropriations to be used on various reservations in the discretion of the Secretary of the Interior, Congress had been making, for irrigation development on certain of the reservations, specific appropriations. These are discussed in detail in the special reports of the projects contained in Part II of this report.

Up to and including the fiscal year 1914, the cost of all irrigation work undertaken on Indian reservations under the general appropriations "Irrigation Indian Reservations" made since 1884, had been borne by the United States, and most of the work done under special or specific appropriations for certain projects had been charged against Indian tribal funds, or made reimbursable out of tribal funds, although in a few instances special appropriations had been made from the United States Treasury.

Prior to 1914, the cost of these Indian irrigation projects that had been made reimbursable was charged against the Indian tribe benefited, and not against the particular land that was benefited by the irrigation works. This was unfair as in most, if not in all cases, the irrigation projects included only a part of the reservation so that the land of many of the Indians was not included in the project. By the legislation enacted prior to August 1, 1914, all members of the tribe were required to pay an equal part of the cost of the irrigation system regardless of whether or not they received any benefits.

Early irrigation appropriations made reimbursable.—In the appropriation act for the fiscal year 1915 which is the act of August 1, 1914, Congress announced a distinct and sweeping change in legislative policy, both in respect to the general appropriations and to the appropriations for specific projects. The general appropriations theretofore made, together with such specific appropriations as had been made from the United States Treasury, and up to that time apparently a gratuity, as well as those thereafter to be made, it was declared should be reimbursable to the Treasury whenever such Indian funds were adequate, and further that the whole cost of any projects theretofore financed by appropriations from the Treasury and made reimbursable from Indian tribal funds, was to be apportioned to those individuals of the tribe whose lands were actually benefited, thus making the irrigation charge an individual or personal obligation, instead of a tribal obligation as it had been theretofore.

Gratuitous appropriations converted into reimbursables.—As a result of the act of August 1, 1914, debits aggregating nearly $3,000,000 representing "Gratuitie Converted Into Reimbursables" as listed in Appendix B, Hearings House o Representatives Committee on Indian Affairs of Sixty-sixth Congress, were set up against various Indian tribes for irrigation works constructed during the 30-year period 1884 to 1914.

The reimbursement provision of the act of August 1, 1914, particularly the retroactive feature of it, whereby appropriations previously made apparently as gifts or gratuities to the Indians were converted into reimbursables, has been the subject of much bitter criticism on the part of the Indians affected and by their friends. It is argued by many, that by reason of the retroactive feature, it is unconstitutional.

Law of February 14, 1920.—For several years following the act of August 1, 1914, no steps were taken, and no regulations formulated by the Interior Department looking to an apportionment of irrigation costs as therein directed, the reason being given that the costs could not be known until the irrigation systems were completed, and that practically none of them was then completed. In this situation, Congress in the Indian appropriation act of February 14, 1920, inserted a provision directing the Secretary of the Interior to require the owners of irrigable land under any irrigation system theretofore or thereafter constructed for the benefit of Indians, and to which water can be delivered, to begin partial reimbursement of the construction charges where reimbursement is required by law, at such times and in such amounts as he may deem best. Under this law assessments of construction costs have been made against irrigable lands since November 15, 1920, and as reported by the Indian Bureau collections made "wherever possible."

Water rights and water supply.—It is our opinion that the all-important subject of water supply for many of the Indian irrigation projects is being neglected. Apparently in an effort to economize, the reliable and continuous stream-flow records that are essential for a determination of water supply, are not being continued on some of the projects. The water supply available for a project may be determined in either one of two ways: By accurate stream-flow records over a long period, or by building the project and then ascertaining by actual trial whether the water supply is sufficient. The Fort Peck project is an instance of the latter method. It cost approximately $1,000,000 to learn that the water supply is inadequate. By the other method, which is the one usually employed, it would have cost a few thousand dollars.

It is apparent that since the date of the Winters decision (promulgating the principle that by the establishment of an Indian reservation in the arid country,

the Government by implication appropriated and reserved a right in any water available to the extent necessary to irrigate all the irrigable land within such reservation) there has been a tendency on the part of the Indian Bureau to rely alone on this decision, and in consequence to make little or no effort to initiate and to protect the water rights for the Indians in accordance with the generally established laws and customs that are recognized throughout the arid country.

Inadequacy of water supply.—It is our judgment that many of the projects have already been extended over larger areas than the water supply available will satsfactorily serve. It is our conclusion that in some cases extensions have been made either without the knowledge of the Indian Bureau, or at least without a realization of the magnitude of the extensions and their significance. In some instances one is forced to the conclusion that the only purpose in making the extensions was as a pretext for reporting a larger acreage under constructed works and thus be in a position to secure larger Congressional appropriations for operation and maintenance. As yet, since only a small part of the so-called irrigable land under constructed works is being utilized, there is not much complaint as to the insufficiency of the water supply. When, however, an attempt is made to irrigate all the land "under constructed works" instead of one-fourth or one-half of it as now, there is bound to be trouble and the Government will be confronted with claims both by Indians and by whites, demanding damages for failure to deliver water to land which has been allotted or sold with the promise that such land carries with it a water right. In reports on file in the Indian Office relating to both the Crow and the Wind River Reservation projects, it is admitted that there has not always been an adequate water supply for the acreage now in cultivation; that storage will or may be necessary when all the land is utilized; but at the same time doubt is expressed as to whether there are any feasible storage sites. It seems that this is a matter that should have received consideration before the canals were extended over the areas they now cover.

The Winters decision.—The Supreme Court in its decision in the case of Winters *v.* United States on January 6, 1908, held that there was an implied reservation in the agreement with the Indians establishing the Fort Belknap Reservation, of a sufficient amount of water from Milk River for irrigation purposes, and that the water of that river can not be diverted so as to prejudice this right of the Indians by settlers on the public domain.

Following the Winters decision the tendency of the courts up to the present time seemingly has been to be more and more liberal in protecting the Indians in their water rights. As an instance, the Circuit Court of Appeals, ninth circuit, May 2, 1921, in Skeem et al. *v.* United States et al., held "the purpose of the Government is to induce the Indians to relinquish their nomadic habits and to till the soil, and the treaties should be construed in the light of that purpose, and such meaning should be given them as will enable the Indians to cultivate eventually the whole of their lands so reserved to their use."

In the case of the Conrad Investment Co. *v.* the United States, it is held by the United States district court with reference to the waters of Birch Creek, a boundary stream of the Blackfeet Indian Reservation in Montana, that although the Indians, after using the water for a time, subsequently fail for a period of time to make use of it, yet such failure to make beneficial use of the water for the purpose of irrigation shall not in any manner jeopardize their rights should they at any future time desire to resume the use of such water for irrigation.

It is the opinion of the advisors that the principle enunciated in the Winters decision is a measure of simple fairness and justice to the Indian, and is essential to his welfare. We believe, however, that in making practical application of this principle the Government and not the pioneers should stand whatever losses may result from the Government's failure to properly protect the Indians in their water rights. In our judgment the Government owes a duty to the pioneers as well as to the Indian. It should be borne in mind that "the winning of the west" is the work of the pioneer. The pioneers, acting upon the tacit, if not the expressed, invitation of the Government, have subdued the western arid regions and made them habitable for man. They also assisted in working out the Indian problem, both in the days when the rifle was the accepted instrument for the solution and also in these later days since more humane methods have been adopted, and the rifle has been discarded for the plow as the means of solution. The pioneers have in many cases brought civilization to the Indian, and supplied him with a market for his labor, without which the Government would have been under the necessity of supporting large numbers of Indians in idleness. Had the Winters decision been promulgated in 1848 instead of 1908, it would have effectually barred the settlement and development of much of

the arid regions of the West, as in that case the pioneer, knowing that there was a probability that at some time he would be required to relinquish his water supply to the Indian, would have had little or no incentive to build irrigation systems and place the land under cultivation.

The advisors feel that in all cases where the application of the principle involved in the Winters decision would result in the loss of water rights regularly acquired by white settlers through appropriation and beneficial use, and in consequence considered valid under State laws, the Government should provide an adequate water supply for the Indians in question, either by purchase of valid rights or the construction of storage reserviors for the impounding of flood or surplus waters, such purchase of rights or storage reservoir construction to be paid for out of gratutious appropriations.

As a matter of fact the purchase of water for Indian lands as opposed to the confiscation of water already being beneficially used on other lands is not without precedent. On the Yakima Reservation, Wash., Congress appropriated funds for the purchase of reservoir water for Indian lands, whereas had the principle of the Winters decision been enforced, white settlers who were using the natural stream flow would have been required to relinquish such water for the Indians.

Inconsistency in the practical application of the Winters decision.—The advisors fail to see any consistency in the application or practical working out by the Indian Bureau, of the principle involved in the Winters decision. In some instances, as on the Walker River and Southern Ute Reservations, it is proposed to take the additional water needed for Indian lands from the lands of settlers where it is already being beneficially used. In the case of the Yakima Reservation, neighboring white-owned lands are left in undisturbed possession of the water already developed, and the Government purchases storage water for Indian land, which in the opinion of the advisors is the only just and equitable manner of applying the basic principle of the Winters decision.

On the Gila River Reservation of Arizona, the Pima Indians who were irrigating their lands when first visited by the early Spanish explorers as early as 1540, were deprived of their water supply by the irrigation development of white settlers upstream from them. A storage reservoir is being built in an effort to restore to the Indians the water to which they are justly entitled; but it is proposed that each acre of Indian land shall pay its prorata share of the cost of the reservoir, in the same manner as the white-owned lands outside the reservation that are to be benefited. In other words, the Indian lands are to be penalized at the rate of $50 per acre for the failure of the Government to protect their water rights. We fail to see any justice for the Pima Indians in this plan. We believe that the Government itself, and not the Pima Indians, should make good the failure of the Government to protect the Indians in their water right, and that by means of the storage now being developed there should be restored to the Pima Indians, without cost to them, a water supply adequate for the irrigation of at least the maximum acreage they irrigated prior to the encroachments of the white settlers, which is what they would be justly entitled to under the fundamental principles of irrigation law and practice that are universally recognized in all the States throughout the arid region.

Land and allotments.—In his primitive condition the only use the Indian had for land was as a hunting ground, and hence he knew nothing of land ownership as we understand the term. As a result of his barbarous mode of life the land could sustain but a very small and widely scattered population. Before the advent of the white man each tribe held such land as it could against the encroachments of its neighbors; and there were frequent conquests and shifting of tribes. Under such circumstances, even though the Indian had been inclined toward agricultural pursuits, his temporary and questionable tenure of the land would have effectually barred any progress in agriculture.

Later, when the Indian reservations were established, there was no individual ownership of land, but the ownership of the reservation was in the tribe.

The general allotment act.—The breaking up of the tribal estates or reservations, and allotting or dividing the land among the individual Indians, was provided for by the act of February 8, 1887, commonly called the Cawed Act, or the general allotment act. Its purpose was to give each Indian his proportionate share of the land, thus creating an individual opportunity and responsibility, and providing an incentive to personal effort and initiative which is essential to the development and welfare of all human beings.

In order to prevent the Indian from disposing of his land, he receives a trust patent with restrictions upon alienation for a period of 25 years. At the expiration of the trust period he may be given a patent in fee. Patents in fee may also

be issued to Indians competent to handle their own affairs under the provisions of the Burke Act. When a patent in fee is issued, the Bureau of Indian Affairs has no further control of the land.

Indians have more land than they can use.—Allotments of land on the irrigation projects under consideration vary from 10 to 80 acres in size, being 40 acres each on most of the projects. As a result of the system usually followed whereby every Indian, regardless of age or sex, receives an allotment, the Indian family of average size has considerably more land than they can use at the present stage of their development, and in fact more land than the average white family in an irrigated country has, or can use. On projects where 40-acre allotments have been made, the average Indian family will have about 200 acres of land. It is, of course, impossible for them to use it. In such a case, ordinarily 40 or 50 acres, or even less, will be used by the Indian, while the remainder, unless it is leased, will not be used.

Unused land on irrigation projects.—The result is that on the average Indian irrigation project, only a small part of the land will be used by the Indians, and the acreage being used will be in small isolated tracts scattered over the entire project. This necessarily means that the irrigation system for the whole project must be operated and maintained for serving only a small part of the area that has been provided with irrigation facilities, and that the cost for serving this small acreage will be practically the same as it would be if the entire project acreage were utilized.

The Indian usually is unable to pay irrigation charges even on the land he actually farms, so it can not be expected that he can pay such charges on his unused land. The irrigation operation and maintenance expense on Indian land not leased is usually provided for by congressional appropriations made for that purpose, wh ch, in most cases, are reimbursable; that is, it is intended that the cost shall be repaid to the Government. Because the Indian is unable to pay this annual charge, it is usually assessed or charged against the land.

Defects of the allotting system.—In view of the fact that the system of allotting results in so much idle land, it would appear that smaller allotments should have been made, or allotments made only to heads of families so as to restrict the allotted acreage, and hence the irrigation projects, to much smaller areas than are included in the present projects, thus greatly reducing both the construction and operation and maintenance cost. On many of the reservations, however, the apparent desire was to divide all the irrigable land among the Indians. After this course was decided upon the logical and laudable thing to do was to extend the irrigation system over the entire irrigable area, so that any Indian, regardless of his location, should be able to farm his land if he cared to do so. The principal reason, however, in many cases, for extending the irrigation system was to initiate and protect the water right for as much land as possible without which the land itself would be of little value.

The allotting system assumes that it is possible to make of every Indian a farmer. The speechless babe and the gray-haired man are given allotments the same as the able-bodied head of a family. It could not be expected, were we to take an equal number of our own race, men, women, and children, and place them on allotments on an irrigation project, that they would all become successful farmers and that the land would all be utilized. On what theory then can we expect it of the Indians who are but a generation or two removed from barbarism? The experience of our Government and corporate irrigation projects, built for our own race of people, where the farmer is attempting to farm from choice, is that the majority of them fail.

The Indian as a farmer.—The coming of the Caucasian with his civilization meant for the Indian a revolutionary change in his method of living. As warfare and hunting became less and less their chief occupation, it became apparent that some new means of subsistence would have to be provided. Since some of the eastern tribes had practiced a limited agriculture in a crude way, and a few tribes in the Southwest had even progressed to the extent that they practiced farming under irrigation, it was but natural to look to the land as a source of subsistence for the Indian.

The Indian's requirements for life, as prompted by his own efforts and labors, are still very limited. Where he is compelled to work for what he receives, he confines his efforts largely to securing only the barest necessities of food and clothing without accumulating any reserve. If money comes from other sources he will naturally relax his efforts and accomplish less by his own work. On projects like the Klamath where the Indians have incomes of $500 to $700 each from the sale of timber, and on the Yakima project where much of their land can

be leased for $8 to $10 per acre annually, farming by Indians, as might be expected, has almost ceased.

It is not natural to suppose that all Indians will be inclined to agricultural pursuits any more than all people of our own race would be inclined to agriculture.

Need for advice and assistance.—Indian farmers have been supplied to assist and teach the Indian to farm, but the type of men employed and the work required of them are such that the effort has, in a large measure, been a failure. Men for this position are usually employed at low salaries, and either have little ability or are assigned to other duties that occupy their time and attention. A man for this class of position should be of the type usually employed as county agent or farm adviser in our advanced agricultural districts, and should be paid a salary commensurate with his ability.

Need for financial assistance.—Very few of the Indians possess the capital, stock, tools, or equipment with which to clear and level the land and construct the necessary laterals upon their allotments, and this was especially true when the Government irrigation systems were completed, making water available for irrigation. Some, of course, made attempts to place their allotments under cultivation, but only in exceptional cases was it done in such a way as to make possible efficient farming. Some small advances were made to assist them with the improvements, such as building small houses or the purchase of seed, which was sometimes used as food instead of being planted as intended.

White settlers on other irrigation projects under similar conditions have failed. Indians need such assistance even more than the whites.

The necessities of aiding the Indian to get started have to a certain degree been recognized, and the improvement lease has been utilized by the Indian Bureau to meet this condition. This, however, solves the problem by a round-about instead of by a direct method. The Indian is more interested at the time water first becomes available for the irrigation of his allotment, and if he could at that time be put to work upon his land under proper supervision, there would be a greater chance of success than when a major part of the land has to be placed under an improvement lease in order to improve it, with the loss of three to five years' time.

Unsatisfactory health conditions delay progress.—One of the reasons for the failure of the Indians of some tribes to progress in the development of their land is the unsatisfactory health conditions. Many of them are invalids in such a state of health that they can not be expected to perform manual labor. It is the opinion of many that the unsatisfactory health conditions in many instances are the result of undernourishment, as many of the Indians have insufficient food, or food of improper variety, to properly sustain life. Among some of the tribes the drug habit is prevalent. It is noticeable that, particularly in the small Indian colonies which are found near the towns in the Indian country the drug habit is increasing very rapidly.

Necessity for farm advisers.—It is our conclusion that the Indian Bureau, in failing to provide properly qualified and experienced men to instruct and advise the Indians in their farming operations, is neglecting its greatest opportunity to assist them in becoming industrious and self-supporting citizens. One principal difficulty with the present system is that most of the school farmers are required to act as assistants of subagents in their districts and hence can give very little, if any, time to the actual work of instructing and assisting the Indians in farming. As one superintendent explained, "they procure and distribute seed, implements, livestock; negotiate leases, make collections of cash and crop rentals, adjust disputes between Indians and between Indians and lessees, appraise Indian lands and handle the papers involved in sales and leases, see that children attend school, issue rations, make reports, and do many other things," and then, if they have any time left, they teach the Indian how to farm. On several of the reservations the Indians complained that the farmers the Government supplied to teach them knew less about farming than those they were attempting to instruct. Quite frequently the Indians referred to the low salaries the farmers are receiving as evidence of their incompetency, stating that if they were efficient and competent the farmers would not work for what the Government is paying them.

Leasing of Indian lands.—The general allotment act, or Dawes Act of 1887, provided for the allotment of a tract of land to each and every Indian. The fact that many allottees would be physically incapable of using their land was apparently overlooked, and no provision was made for leasing. This situation was corrected by the act of February 28, 1892 (26 Stat. 794), which provided that in case of incapacity by reason of age or other disability, the land of an

allottee might be leased for a term not exceeding three years for farming or grazing purposes.

In 1894 the scope of the leasing law was extended so as to permit of leasing more land by making it read "by reason of age, disability, or inability," and the period of lease was extended to five years.

Necessity for leasing.—The development of an irrigated farm is a difficult and expensive task and one requiring far more capital, ingenuity, and perseverance than most Indians possess. In fact, so many farmers of our own race, even those having ample capital, have failed on the projects of the Bureau of Reclamation that the bureau has adopted the plan of carefully selecting its project settlers, requiring of them in addition to ample capital, actual experience and such other qualifications as are known to be essential for a fair chance of success. If such a small proportion of our own race can make a success of irrigated farming, that it is necessary to make such careful selection in order to obviate numerous failures, how can it be expected that every Indian can succeed as an irrigation farmer? Only the very exceptional Indian can make of his allotment an irrigated farm. For the vast majority it has been necessary to have recourse to what is termed the improvement lease, in order to improve the allotments on the various irrigation projects.

Improvement leases.—The land is leased, the lessee having the use of it for a certain specified period, usually from three to seven years, as a consideration for his improving it, and turning it back to the Indian at the expiration of the lease term, with a part or all of it in some specified crop. It is particularly essential on an irigation project, for two reasons, to improve the land as soon as the project is completed, and to farm it continually. First, because of the necessity for perfecting the water right, and second, in order that the irrigation charges may be paid from the returns of the land. On many of the Indian irrigation projects, while operation and maintenance, and construction costs are met by congressional appropriations, these are reimbursable, and in most cases are a lien against the land. These charges are thus constantly accumlating and in some instances are already equal to, or greater than the value of the land. It is therefore evident that the land must be leased on terms that will permit the lessee to meet the charges from the production of the land if the Government is to be repaid the cost of constructing, operating, and maintaining the irrigation system.

The improvement lease which has been used was a necessity growing out of the lack of funds of the Indian to improve his land or the Government's failure to complete the reclamation of the land to the point of making it ready for production

It was the expectation that at the expiration of the improvement lease the Indian, at least the able-bodied Indian, would take up farming operations where the lessee left off and become a successful farmer. In many instances, however, this has not proved true. Frequently the Indian refuses to do anything with the lan d, or he may use only a small part of it. If it is in a country where there is a demand for improved land, he naturally prefers to lease it for a cash or crop rental, and thus live from the rentals rather than to work the land himself. The Indian justifies himself in this procedure by the argument that he does not understand farming, and that by renting the land he gets much more out of it than he would by farming it himself. The Indian Bureau officials justify leasing by the argument that the Indian refuses to use the land, and that it is necessary to lease it in order to protect the water rights and to pay irrigation charges, which are both good and logical reasons.

Present leasing policy often enables Indians to live in idleness.—In many instances the result of leasing, if the proceeds go to the Indian, is to encourage indolence and improvidence. It is in effect a virtual return to the ration system, by which the Indian enjoys the rewards of labor without experiencing its inconveniences. Conditions of this kind are particularly noticeable on the Yakima project, where there is such a demand for the land that it brings from $6 to $10 per acre per year, and in consequence the Indians live in idleness on this income.

If the purpose of building the Yakima project was to enable the Indians to live in indolence and improvidence and to enable Caucasians and Mongolians to reap proceeds from irrigation development made under the guise of being a benefit to the Indians, it is a wonderful success. If the purpose was to make the Indian a self-supporting, law-abiding citizen, it is not a success. The advisors are unable to suggest any substitute for the leasing system. In many instances it is necessary, in order to protect the water right and to pay irrigation charges, to develop the land. In the many cases where this can not be done by the Indians, it seems that the only logical way in which to do it is

through leasing. It is necessary, however, for the welfare of the Indian, to work out some plan of leasing whereby the able-bodied Indian will be required to support himself by his own efforts, and not be allowed to live in idleness from land rentals. The able-bodied Indian having no other occupation should be required to farm a part of his land in a satisfactory manner, and if he fails to do this any rentals received from that part of his land leased should be withheld or applied in the payment of irrigation costs, or in making permanent improvements on his land. In all cases where the receipt of land rentals are encouraging indolence and profligacy, they should be withheld.

If existing legislation will not permit the withholding of such funds from the Indians for their own welfare, necessary legislation should be secured.

Acquisition of Indian project lands by whites.—A result that naturally followed the allotment of lands to Indians on many of the reservations was the disposal, by sale or homestead, of the surplus or unallotted land, and later the sale of inherited and fee patent land.

A double benefit was to be derived from the acquisition of land by whites. The proceeds from the sale were to give the Indian sufficient capital to enable him to develop his own land; and the coming of white neighbors, who in taking up farms about him, would stimulate him by their example and their standards of living, so that civilization would come to the Indian.

The surplus lands, where at all desirable, were soon taken, and the influx of white settlers began as soon as permitted. In making allotments the topography of the country was never considered, with the general result that both Indian and white owned lands, even those acquired by homestead, are often under the same irrigation system.

The system of allotting lands to all Indians regardless of age or sex, and frequently years in advance of constructing the irrigation system, and the policy of selling Indian lands soon resulted in many Indian allotments passing into white ownership.

Sale of inherited Indian land.—Lands of deceased Indians may be sold when necessary to divide an estate. The land of an allottee holding trust patent may be sold on his petition if such sale is deemed to be for his best interest. It is reported that on the various reservations of the United States for the period 1911 to 1926 a total of approximately 2,000,000 acres of Indian inherited land were sold for an approximate total price of $37,000,000, and approximately 3,000,000 acres of trust patent lands were sold for approximately $46,000,000. Such of these lands as are included in irrigation projects when sold carried with them the rights that the Indian had in the irrigation system, but in many cases the sale price did not include the proportionate share of the irrigation construction cost, nor was there any provision made for collecting the irrigation cost from the purchaser. The method of allotting and selling Indian lands has frequently placed the Indian irrigation service in the position of operating and maintaining irrigation systems more for white people than for the use of the few Indians under the system.

Fee-patent Indians frequently sell land.—When a patent in fee is granted, all jurisdiction of the Indian Bureau is at an end, and the Indian is then free to dispose of his property and money as he sees fit. It is known that many Indians as soon as the patent in fee is received sell their lands. Unfortunately no records are kept, so it is not accurately known what proportion of Indians receiving fee patents dispose of their holdings, but it is variously estimated by superintendents that 70 to 90 per cent of them immediately sell their land.

On the Crow, Wind River, and Uintah Reservation projects particularly a considerable acreage of land, both deceased and fee patent, has been sold and no provision made for collecting the irrigation construction charge from the purchaser, and the Indians having received the proceeds from the sale of the land and in practically all cases having disposed of the money, collection can not be made from the former Indian owners. As a result there is no possibility of collecting the construction charge on such lands. No record has been kept of the acreage thus sold. On the Crow Reservation a suit for collection was brought by the Government against a purchaser for the collection of approximately $10,000. This suit, however, resulted in a decision unfavorable to the Government.

Reimbursement of irrigation charges.—Beginning in 1867 and continuing until 1914, except for a few projects that were charged to or made reimbursable from the tribal funds or resources of the Indian tribe affected, Indian projects were built out of funds from the United States Treasury, provided by congressional appropriations, in which nothing was said of reimbursement. In consequence,

such appropriations were considered as gratuities or gifts to the Indians, to assist in their civilization and to enable them to become self-supporting, in the same manner as the appropriations regularly made for educational and health work among the Indians. For many years Congress has regularly made large appropriations from the Treasury for the support and civilization of the Indians. For several years past these appropriations have ranged from ten to fourteen million dollars annually, about one-half of which is expended on education alone. It is reported by the Indian Bureau that since 1871 about $500,000,000 has been expended in behalf of the Indians.

By the law of August 1, 1914, Congress not only declared that all Government funds thereafter to be expended for irrigation, but also that all funds theretofore expended for that purpose on Indian projects, should be reimbursed; that is, returned or repaid into the Treasury. By this law about $3,000,000 that had up to that time been considered as a gratuity, was made reimbursable.

The law of August 1, 1914, providing for reimbursement of Indian irrigation projects, particularly the retroactive feature, has been the subject of much discussion, and much bitter criticism by Indians and many friends of the Indians, as well as by many officials of the Indian Bureau.

It is stated by some that the reimbusable feature of the law of August 1, 1914, was inserted for the purpose of making it easier to get appropriation bills for Indian irrigation through Congress. Whether or not that was actually the purpose of any of the proponents of the law, it undoubtedly has had that effect.

Character of early irrigation work.—It will be appreciated that a vary large part of the Indian irrigation work done prior to 1914, and practically all of that done prior to 1905, as a result of inadequate supervision and other adverse conditions, was very unsatisfactory, and was very wastefully done. In many instances the irrigation systems built in the early days have been partially or wholly abandoned as useless, and succeeding generations of Indians are now asked to reimburse the Government for expenditures made for the purpose of benefiting their ancestors, even though the sole benefit in many instances was that it may have afforded them temporary employment. In consideration of the way in which the Indian irrigation work has in practically all instances been conducted, particularly that much of the early work was done largely, if not primarily, to give the Indians employment and to teach them to work; that in order to make employment for the greatest number possible, inefficient methods and equipment were often purposely used; that much of the work was done without engineering advice or supervision; that much of it has been avandoned or rebuilt; that much of it has been done piecemeal—that is, spread over a long term of years—involving excessive overhead expense; that in many instances there were no comprehensive plans, but projects have grown up in a haphazard way; that in many instances there have been frequent changes in plans; that many of the projects have already been extended over larger areas than the water supply available will serve; that many projects contain large areas of nonirrigable or nonproductive land; for these and many other reasons that might be mentioned it is a matter of great difficulty to arrive at an equitable basis on which reimbursement or irrigation charges may reasonably be expected.

Trend of legislation affecting reimbursement.—From the fact that the Indian irrigation projects are in the same general territory as Federal reclamation projects there is a tendency to consider the Indian projects in the same light; that is, from the standpoint of profitable agriculture and the return of the funds invested in irrigation works.

That Congress considers the return of the expenditures a matter of secondary importance is indicated by the San Carlos legislation, which was recently passed. In that case it appears that there is no intention that there shall be collections from Indians so long as they own the land. Collections are to be made only when the land passes to whites. With respect to several other projects, as for instance, Fort Hall, Uintah, and Southern Ute, it is provided that the lien for the cost is not effective so long as the land is occupied as a home by the Indian or his heirs.

Indians unable to pay irrigation charges.—In our judgment it is useless, at the present stage of his agricultural development, to expect the Indian, except in a very few instances, to pay either irrigation construction or operation and maintenance charges on land that he operates himself or that is not leased. As a matter of fact we believe that the legislation requiring reimbursement, particularly the law of 1920, has in a considerable number of instances caused him to slow up or to lose interest in the development and use of his irrigable land. Many of the Indians profess to see in this legislation a scheme of the Government

to confiscate their land by accruing the irrigation charges against it until these charges exceed the value of the land.

In some instances an Indian may have 40 or 80 acres of irrigable land. He may have inherited a like amount and may be attempting to cultivate some of it. He may be able only to use a small part of it, but he is called upon to pay the irrigation charge on the entire irrigable area that he possesses; on land not used, as well as the land used. If he grows alfalfa, there is no market for his surplus, and the result is that if an effort were made to enforce collection of the irrigation charges against this Indian, it would not only be impossible to collect, but it would probably discourage him so that he would give up all efforts at farming. For this reason in many instances the Indian is anxious to sell his land. As a general condition Indians everywhere object to paying irrigation charges, and in but few instances are paying them, and then never willingly. In all but a few exceptional instances it is a physical impossibility for them to pay, and in general if efforts are made to enforce payment they give up trying to farm.

Inconsistency of legislation concerning reimbursement.—Attention is called to the inconsistency of the legislation relating to reimbursement. On some of the reservations Indians are required by law to pay both construction and operation and maintenance charges, while on others it is specifically provided that they shall not pay irrigation charges, either construction or operation and maintenance, and on the Fort Hall project lands leased for a period of less than three years are by law exempt from irrigation charges.

Many project farmers demand reduction of irrigation charges.—On many projects there is an insistent demand by whites who have acquired land, that the irrigation charges to be repaid by them be arbitrarily reduced to an amount that, in their opinion, they are able to pay. Their opinion on conclusion as to what they are able to pay is of course based on present economic conditions. Conditions are constantly changing. What may be high construction charge to-day may be a reasonable one to-morrow.

On one of the projects under consideration the white farmers were practically a unit in their insistence that they could pay no more than a $40 per acre construction charge, distributed over a repayment period of 40 years, regardless of the actual cost to the Government. On this project the average construction cost to date is nearly $50 per acre, and with nonirrigable and unproductive lands eliminated, it is probable that it will be considerably more. Yet in the face of the insistent demand of these farmers that they can pay no more than $40 per acre, the Government is being urged to make large additional expenditures on this project.

If under present economic conditions the water users state they can meet a $40 payment within 40 years, what would be their ability to pay with no more sacrifice if sugar factories and cheese factories, creameries, and other industries were developed with more good highways so they that could readily market their produce and the project were fully under cultivation?

It is our conclusion that there is no justification for arbitrarily writing off, or reducing irrigation charges to what, in the opinion of the project farmers, they are now able to pay. We believe they should pay for all necessary features of the project if the work has been done in a reasonably efficient and economical manner.

Valuation survey.—It is our conclusion that for those Indian projects in respect to which the amount of construction cost reimbursable is not fixed by existing law, a valuation survey offers the only possible and the only equitable method by which to arrive at the amount of construction cost that land owners reasonably, and perhaps legally, can be required to pay. This would apply to all projects other than the Fort Hall, or such projects whereon the amount to be reimbursed is specifically fixed by law at considerably less than the actual cost of replacement.

The object of such a survey would be a determination of the replacement cost of all useful and necessary features of the irrigation systems of each of the projects. Such a survey would exclude from the amount to be repaid the excess cost involved in construction primarily to give the Indians employment; excess cost resulting from piecemeal construction; excess in cost of unnecessary and unusual types of construction over the cost of necessary and usual types; cost of structures that fail to function, as the conduit of the Sacaton Dam; cost of replacements made necessary as the result of improper design or workmanship in the first instance, as the Blackfoot Dam; and cost of all appurtenances not a part of the irrigation system, as the Sacaton Bridge on the Gila River Reservation project.

ESTIMATES, COSTS, AND COLLECTIONS

Estimates of cost.—Many of the Indian irrigation projects are not yet completed as contemplated, and extensions and improvements are being made from time to tome as funds are available. The estimated costs for completing, in many instances, are matters of opinion or guess, rather than estimates in the generally accepted sense of the term, as there are no definite plans for completion, and in fact the surveys and investigations necessary for making such plans have not been made.

We regard it as essential, before proceeding with the completion of any of these projects, or any extensions to them, that surveys and investigations be made for the purpose of determining the feasibility and probable cost of such work.

The extent of the work contemplated is indicated by the fact that while 692,057 acres are reported as now provided with irrigation facilities, this is less than one-half the estimated irrigable area with all projects completed.

The estimated total construction cost with all projects completed is given as $56,014,255.64, which is approximately $29,000,000 for the work yet to be done.

Construction, and operation and maintenance cost.—There was expended for construction of irrigation works on all projects to June 30, 1927, a total of $27,140,782.62, and for operation and maintenance $8,827,143.10, or a total of $55,967,925.72.

As compared with the 692,057 acres reported as now irrigable from the irrigation system as constructed, it will be seen that the average construction cost for the acreage now provided with irrigation facilities is approximately $40 per acre.

On the projects included in this survey and report, the construction costs for the various projects range from $10.43 per acre for the Uintah project (Utah) to $102.67 per acre for the Colorado River Reservation project (Arizona).

Collection of construction cost.—The construction cost of all Indian irrigation projects as of June 30, 1927, is given as $27,901,444.75, of which $18,134,426.08 has been expended on the projects covered by this survey and report.

Of the construction cost of the projects specifically considered in this report, which is $18,134,426.08, only $2,201,544.74 has been assessed, and $979,859.79 has actually been collected. The total amount collected thus amounts to 5.4 per cent of the total cost of the projects on which collections are being made. Collections are approximately 45 per cent of the amount assessed. It should be understood that assessments on many of the projects are levied against Indian land as well as white-owned land, and that the Indian has not been required to pay when financially unable to do so, which is the case in all but a few exceptional instances.

Collection of operation and maintenance cost.—The total operation and maintenance cost of all Indian projects to June 30, 1927, was $8,827,143.10, of which $2,658,311.33, or approximately 30 per cent, had been collected. The total operation and maintenance cost as of June 30, 1927 for the projects covered by this survey and report was $7,084,038.35, of which $3,516,469.90 had been assessed and $2,595,782.82 collected.

Incomplete and unreliable data in justifications for appropriations.—It is noted in some instances that as a result of failure by the Indian Irrigation Service to include complete and detailed information in justifications for appropriations, Congress sometimes apparently appropriates funds for irrigation activities without a thorough understanding of the work contemplated. An apparent instance of this kind is noted in the congressional subcommittee hearings on the Indian bill for the fiscal year 1928, wherein request was made for an appropriation of $520,000 for certain construction work on the Yakima Reservation; and the statement is made that the work contemplanted will reclaim 20,000 acres of land. It is our understanding, however, from our study of this project that the actual estimated cost of the work proposed for reclaiming this 20,000 acres is approximately $1,500,000, and that the plan now adopted and being carried out calls for an expenditure of $533,000 (a little more than the amount appropriated) to reclaim only 10,800 acres instead of 20,000 acres as stated in the justification. It is possible, as explained by Indian Bureau officials, that the extent of the development herein involved may have been fully understood by the congressional subcommittee, but a reading of the hearings leaves some doubt as to whether the extent of the development contemplated was fully comprehended.

Another instance of incomplete data is noted in the discussion of the Blackfeet project appearing in the congressional subcommittee hearings on the Indian appropriation bill for the fiscal year 1929, wherein there is included some statements of a general character and then instead of disclosing the conditions actually

existing (that the Indians are making practically no use of the irrigation facilities provided by the Government, having irrigated only 45 acres during the season of 1926), the statement is made: "Some of this land is irrigated by Indians and more will be." In the face of the fact that the acreage utilized by Indians has been rapidly decreasing for some years, we see no justification for the statement that more of this land will be irrigated by Indians. Assuming that as a result of misinformation in this justification, the appropriation of $45,000 for the fiscal year 1929 was made without a knowledge of the existing conditions, and inasmuch as we are recommending the abandonment of this project, we are herein also recommending that no part of this appropriation for the fiscal year 1929 be expended for permanent repairs or improvements until the congressional subcommittee shall have had an opportunity to consider the matter in the light of more reliable information.

Much of the data relating to the utilization of land, crop production, and other activities in the reports and justifications from some reservations is so exaggerated as to be worse than useless. As instances of this, several thousands of acres virtually, if not actually leased to, and farmed by Japanese on the Yakima Reservation are reported as being farmed by Indians. On the Klamath Reservation, the area reported as being farmed by Indians is many times the area that they actually farm.

Necessity for accurate and reliable data.—Without reliable and trustworthy records and statistics of what has been accomplished, it is impossible to determine whether the results secured are satisfactory and what changes, if any, are desirable to promote better results. Without accurate information, those entrusted with the administration of activities, and legislation respecting them are proceeding blindly. Records are particularly essential respecting Government activities, as it is the right of every one desiring it, to have reliable information respecting the activities they are supporting. The necessity for such information increases with the magnitude and complexity of the work to which it relates. Information should be available, and available in such form that it can be readily utilized.

In the course of our work we have been greatly alarmed and concerned at the general tendency on the part of many Indian Bureau officials and employees, in the preparation of reports designed for the purpose of showing the progress of the Indians, to be extremely optomistic and sometimes unreasonably so. In some cases the distortions of actual conditions are so great that they can hardly be excused on the gorunds of optomism, but must be ascribed to downright exaggeration.

It is our conclusion that this tendency toward overoptomism or exaggeration is the result first, and in most instances, of that profound spirit of optomism concerning the Indian and his welfare that characterizes many of the Indian Service employees, and second, of a feeling on the part of some employees that tenure of employment, salaries, and promotions may depend upon whether each successive report shows an improvement in the conditions described in the preceding report.

Inadequate salaries and the missionary spirit and some of the results.—The advisers share the conclusion frequently expressed by others who have studied the Indian Bureau and its work, that the bureau is greatly hampered and is thus unnecessarily prolonging its welfare work of civilizing and making the Indian self-supporting, by its failure to maintain a reasonably efficient and qualified corps of employees. The missionary spirit, rather than the salary offered, has been depended upon to secure and to keep employees in the Service.

There can be no loyalty and efficiency in any business organization without reasonable compensation and recognition of services.

Among many of the field employees of the Indian Bureau there is an attitude of hopelessness and discontent. These unsatisfactory conditions are the inevitable results of inadequate compensation, absence of reasonable expectation of promotion or advancement, absence of coordinated organization, and the isolation and unsatisfactory living conditions usually incident to employment in the field. Resignations and transfers are frequent. The average turnover for all permanent employees in the service during the fiscal year 1927 was 67 per cent.

It is not to be inferred, however, that there are not many well-qualified and efficient employees in the Indian Service. There are many who are as well qualified and as competent as could be found anywhere. In fact, it is a matter of surprise that the service has so large a percentage of efficient employees as are actually found when the inadequate salaries and unsatisfactory conditions are considered.

Some results of inadequate salaries.—Inadequate salaries and their inevitable concomitant, inefficiency and incompetency, are reflected in much of the irriga-

tion work on some of the reservations. On the Crow Reservation irrigation system there are many concrete structures, which in our opinion, would have been unnecessary had the canals been properly located so as to conform to natural conditions. Many of those are intricate and complicated in design. In some instances control structures on small laterals, such as are ordinarily built for $75 to $150 each, were found to have actually cost in excess of $1,100 each. An explanation of this unbelievable extravagance is found in the fact that at the time this construction work was in progress and $100,000 or more was being expended annually, the entire project was in charge of a junior engineer at a salary of $125 per month. It is the opinion of the advisors that the responsibility for this waste of public money rests with the organization that will place work of such magnitude in charge of a young and inexperienced engineer primarily for the reason that he can be secured at a salary less than half that ordinarily required to secure a competent engineer. It is our opinion that more than $200,000 has been wasted in building unnecessary and excessively expensive concrete structures on this one project alone.

On many reservations visited there was much complaint on the part of the Indians about the alleged incompetency and inefficiency of Government employees as a result of the low salaries paid. This complaint is very general against the doctors and farmers. It is complained on many reservations that the doctors are so incompetent and inexperienced that the Indians, having no confidence in them, are forced to patronize outside physicians in nearby towns at their own expense. The incompetency of Government doctors is given as a reason by some for the popularity of the Indian medicine men.

ORIGIN AND PURPOSE OF THE SURVEY

For some years, and particularly since the reorganization of the Reclamation Service, involving the correction of certain fundamental defects in policy and the introduction of basic business methods in the conduct of its affairs, there has been on the part of many of those interested in the Indian problem as affected by land reclamation, a growing concern respecting the reclamation of arid lands on our western Indians reservations. This growing apprehension has found expression in the congressional committee hearings on the various Indian appropriation bills for several years past, as well as in numerous complaints from project farmers, both Indian and white. The failure of Indians to utilize their land which has been provided with irrigation facilities, and their consequent failure to make reimbursement to the Government of the cost of irrigation works; the growing tendency on the part of the Indian to alienate his irrigable land, with the probable result that he will soon become a pauper; the tendency of many Indians to subsist on the rentals from irrigated land, while refusing all sorts of useful employment; the accumulation of irrigation charges against irrigable lands, which in many instances already aggregates more than the value of the land; the adequacy of the water supply and the safety of the water rights; the possibility of the loss of water rights in some instances, through failure to make beneficial use of water; the preference of farmers both Indian and white on some projects to operate their land under dry-farm methods rather than under irrigation methods; and their consequent refusal to pay irrigation charges; the failure in some instances to collect irrigation charges from white or non-Indian landowners and lessees, lack of accurate data on most projects concerning the irrigable acreage of productive land, adequacy of water supply, and consequent ignorance of the cost of irrigation development—these, and other related questions, are subjects of increasing interest on the part of those interested in the Indian or in land reclamation.

On March 15, 1927, the Secretary of the Interior, through an arrangement with the Secretary of Agriculture, appointed Mr. Ray P. Peele, agricultural economist of the Department of Agriculture, and detailed Messrs. Porter J. Preston, engineer, of the Bureau of Reclamation, and Charles A. Engle, supervising engineer, of the Bureau of Indian Affairs, to make a survey of the major irrigation projects on Indian reservations. The following is a copy of the letter of instruction addressed to each of the above persons by the Secretary of the Interior. A copy of the inclosure, Analysis of Projects as of June 30, 1926, is also inclosed herewith.

"You, ———, have been detailed to make a survey of irrigation methods and practices on the Indian irrigation projects named in the inclosed tabulated statement entitled 'Analysis of reclamation projects of the Indian Service as of June 30, 1926.' You will also include in this survey the Tongue River project in Montana, which is located a comparatively short distance from the Crow project.

"In making this survey you will study and report upon construction cost and collections; operation and maintenance cost and returns; failure to make repay-

ments to the Government of capital invested; utilization being made of irrigated lands by the Indians, by purchasers of deceased Indian allotments and lessees of Indian allotments, as well as settlement by entrymen of former Indian lands on the Flathead and similar projects; water supply; soil fertility; availability of markets, and other questions involving the feasibility of reclaiming lands of such projects.

"You will find that the laws applying to and governing these irrigation projects are not uniform, and not infrequently they have been enacted for the needs of a particular reservation on which such project is located. Originally in many instances the appropriations for the irrigation work were in the form of gratuities, or such work was to be paid out of the proceeds derived from the sale of the ceded lands of a particular reservation after the expense entailed in disposing of such lands had been deducted. These proceeds were tribal funds. By the act of August 1, 1914 (38 Stat. 583), all such moneys theretofore or thereafter expended on irrigation work on Indian reservations were made reimbursable. This legislation applies to all Indian irrigation projects except where specific law exists. Such specific law exists and applies to the following projects under consideration: Gila River, Flathead, Blackfeet, Fort Peck, Wapato, West Okanogan unit on the Colville Reservation, Crow, Fort Belknap, and Fort Hall. The lands under these projects, as well as the Colorado River project, are subject to a lien created by legislation for the repayment of irrigation charges. The following is a tabulation giving citations of the acts creating liens against the lands under such projects:

"Act of March 3, 1911 (36 Stat. L. 1063), Colorado River project.

"Acts of August 24, 1912, and June 7, 1924 (37 Stat. L. 522 and 43 Stat. L. 475), Gila River, or San Carolos project.

"Act of May 18, 1916 (39 Stat. 140), Flathead, Blackfeet, and Fort Peck projects.

"Act of May 18, 1916 (39 Stat. 154), Yakima project.

"Act of May 18, 1916 (39 Stat. 156), West Okanogan lands on Colville Reservation.

"On the other projects under consideration, as well as many small projects carried as 'miscellaneous projects' in the inclosure, on the several Indian reservations construction costs have been made reimbursable by the act of August 1, 1914, supra, but no specific creation of a lien against such lands to assure repayment of the irrigation costs has been provided. The retroactive feature of the act has resulted in setting up a reimbursable charge against lands that were sold where no provision was made for the payment of the irrigation cost, and, in fact, there are cases where advertisements held out to the propsective purchaser that a paid-up water right went with the land and was included in the purchase price. Furthermore, in this class of cases, while the law provides for reimbursement of irrigation costs, difficulty arises in attempting to collect such charges; this is also true in those cases where fee patents have been issued to the original allottees or their heirs and such allottees or heirs have sold their lands because there was no notice to the purchasers that the allottees had not paid the costs, both construction and operation, during the time the title was in the allottees, as no authority of law authorizes the recital of a lien for unpaid irrigation charges in the patent issued to the allottees. This has resulted in charges accruing during the time such lands were in Indian ownership, and the only apparent avenue open for collection of the reimbursable funds would be to institute proceedings against the original allottee, as such indebtedness is considered a personal indebtedness and not a charge against the land. Such procedure, if otherwise advisable, would not result in satisfying the obligation owing to the fact that the Indians in practically all such instances would be financially unable to pay such charges, and any judgment so obtained would be valueless. Authority for assessing operation and maintenance charges is found in the act of August 1, 1914, and authority for assessing construction charges is found in the act of February 14, 1920. (41 Stat. 408.) All these matters, as well as questions of funds expended where apparently no thought was originally given to the matter of rembursment of such funds that have been and are charged against the irrigation projects, should be given very careful consideration and appropriate recommendations contained in your report. The supervising engineers and the employees of the projects and districts which the survey covers, as well as the superintendents of the reservations, will cooperate with you in making this survey and will furnish information desired and assist in every way possible to enable a thorough and comprehensive understanding of the problems confronting us.

"You will commence the survey on the Florence-Casa Grande, or San Carlos, project in Arizona. It is, therefore, believed advisable for yourself and the other persons mentioned to meet at Phoenix, Ariz., on the 21st of March, and then to proceed from there to Florence, Ariz., to undertake your work. After completing the survey on this project, you will proceed to take up the projects in the following order: Colorado River project, Arizona; thence to Los Angeles, headquarters for Indian irrigation district No. 4; thence to Walker River project Nevada; Klamath project, Oregon; Wapato project, Toppenish-Sincoe project, Satus project; thence to Yakima, headquarters for Indian irrigation district No. 1; thence to Colville project, Washington; Blackfeet and Flathead projects, Montana; Fort Hall project; thence to Blackfoot, Idaho, headquarters for Indian irrigation district No. 2; thence to Billings, Mont., headquarters for Indian irrigation district No. 3; Crow, Tongue River, Fort Belknap, and Fort Peck projects, Montana; Wind River project, Wyoming; Uintah project, Utah; and Southern Ute project, Colorado. After completing the survey you may en route stop at Denver, Colo., where you will prepare your report and submit same, with your recommendations, as soon as practicable thereafter. During this assignment you will be allowed your actual and necessary traveling expenses, including sleeping-car fare and a per diem of $5 in lieu of subsistence. After the report has been completed you will return to your headquarters.

"Sincerely yours,

"HUBERT WORK, *Secretary.*"

The foregoing instructions were amended by instructions of March 22 directing that the above-named persons should also make an economic survey of certain projects of the Bureau of Reclamation; and by letter of June 17, 1927, they were directed to come to Washington to prepare the report instead of at Denver, as at first intended. This change was made so that the data in the files of the Washington offices of the Indian and Reclamation Bureaus would be available in the preparation of the reports.

Analysis of reclamation projects of the Indian service as of June 30, 1926

Name of project	Construction commenced	Original estimated cost	Construction cost			
			Cost of preliminary surveys, prior to conception of project (usually carried in "Construction cost")	Total expended on project	Net construction cost	Estimated cost to complete
Yakima Reservation:						
Wapato	1896	$5,149,595.28	$891.73	$4,336,577.70	$3,239,998.55	$750,000.00
Toppenish-Simcoe	1915	1,893,803.00	13,131.23	173,010.50	143,803.56	1,750,000.00
Satus	1923	2,136,025.08	9,542.80	185,375.28	169,276.62	2,650,000.00
Colville Reservation, Colville	1913	920,835.00	6,329.93	97,873.07	61,835.55	852,000.00
Klamath	1907	3,077,710.00	2,527.50	347,471.96	277,710.06	2,800,000.00
Florence-Casa Grande, San Carlos Project	1867	11,787,148.00	13,449.81	2,767,995.80	2,587,148.71	9,200,000.00
Colorado River	1911	7,846,209.00	108,883.49	993,346.43	[3] 611,209.65	7,235,000.00
Southern Ute	1911	205,000.00	1,740.96	296,282.69	[4] 205,278.91	
Uintah	1905	1,515,366.00		1,906,021.61	907,365.81	608,000.00
Fort Hall	1906	1,760,542.00	5,893.60	2,537,043.12	1,720,942.21	39,600.00
Wind River	1905	2,603,990.00		2,259,483.19	1,441,228.64	1,162,762.61
Blackfeet	1908	3,369,407.00	(5)	1,363,716.45	1,102,999.63	2,266,408.00
Fort Peck	1909	805,000.00		942,004.38	804,178.20	
Flathead	1908	[6] 7,686,317.00		5,916,327.98	5,171,317.37	2,515,000.00
Fort Belknap	1893	670,640.00		583,278.95	340,640.43	330,000.00
Crow	1885	2,634,622.00		3,005,738.94	1,985,662.84	638,847.00
Walker River	1908	289,360.00		191,515.23	129,360.44	160,000.00
Total of 17 principal projects		54,351,569.36	162,391.05	27,903,063.28	20,899,957.18	32,957,617.61
Miscellaneous projects				7,155,783.10	5,454,334.09	1,640,054.11
Total of all projects				35,058,846.38	26,354,291.27	34,597,671.72

Footnotes on page 2244.

Analysis of reclamation projects of the Indian service as of June 30, 1926—Contd.

Name of project	Acreage							
	Estimated irrigable acreage when complete	Acreage bureau prepared to supply water	Acreage irrigated by Indians, 1926	Acreage irrigated of Indian leased land, 1926	Acreage irrigated of white owned land, 1926	Acreage actually irrigated	Actual cost per acre on bureau prepared to supply	Actual cost per acre based on acreage actually irrigated
Yakima Reservation:								
Wapato	120,000	100,000	7,498	38,029	30,933	76,460	$32.39	$42.37
Toppenish-Simcoe	18,000	4,000	527	280	980	1,787	35.95	80.47
Satus	40,000	10,000	170	3,402	1,501	5,073	16.93	33.36
Colville Reservation, Colville	32,473	6,473	166	306	3	475	9.55	130.17
Klamath	130,000	13,180	2,080	116	324	2,520	21.07	110.20
Florence-Casa Grande, San Carlos Project	100,000	45,500	8,000	2,000	27,000	[2] 37,000	56.29	69.92
Colorado River	104,000	6,108	1,896	3,564		5,460	100.00	111.94
Southern Ute	17,200	17,200	4,841		1,150	5,991	11.93	34.26
Uintah	93,000	87,591	14,785	28,334	18,000	61,119	10.36	14.84
Fort Hall	62,000	50,000	9,361	5,768	13,929	29,058	34.42	59.23
Wind River	78,660	56,596	6,548	3,390	14,295	24,233	25.46	59.47
Blackfeet	107,500	21,341	130	3,720	2,954	6,804	51.68	162.11
Fort Peck	152,000	22,794	1,468	767		2,235	35.28	359.81
Flathead	124,500	112,500	1,082	2,035	30,016	33,133	45.96	156.07
Fort Belknap	25,285	16,975	10,466	1,172	160	11,798	20.07	28.88
Crow	69,456	56,030	2,350	12,367	5,885	20,602	35.44	96.38
Walker River	10,000	3,600	1,785	4	20	1,809	35.94	71.50
Total of 17 principal projects	1,284,074	629,888	73,153	105,254	147,150	325,557	33.18	64.20
Miscellaneous projects	107,751	57,540	44,287	7,203	1,752	53,242	94.79	102.44
Total of all projects	1,391,825	687,428	117,440	112,457	148,902	378,799	38.34	69.57

Name of project	Construction payments and assessments			Operation and maintenance			
	Amount due by water users	Amount collected from water users	Amount due but not collected	Total operation and maintenance costs to date	Total operation and maintenance charges	Total operation and maintenance collections	Operation and maintenance unpaid
Yakima Reservation:							
Wapato	$649,986.96	$604,023.76	$45,964.20	$1,018,008.57	960,228.04	$954,713.99	$5,514.05
Toppenish-Simcoe	[1] 50,331.05		50,331.05	16,700.49	876.25	876.25	
Satus	[1] 59,246.60		59,246.60	7,600.68	2,769.65	2,769.65	
Colville Reservation, Colville	[1] 21,642.00	13.00	21,629.00	35,330.62	1,616.78	874.52	742.26
Klamath	37,339.30	4,940.45	32,397.85	63,680.61	13,579.00	5,120.36	8,458.64
Florence-Casa Grande, San Carlos Project				67,718.31			
Colorado River	94,109.50	7,054.94	87,054.56	372,257.27	76,362.55	74,090.57	2,271.98
Southern Ute	58,007.86	478.54	57,529.32	79,826.29	69,652.64	3,971.70	65,680.94
Uintah	[1] 317,578.03		317,578.03	869,554.08	282,389.99	230,497.16	51,892.83
Fort Hall	74,065.05	58,661.06	15,403.99	746,866.61	291,291.91	286,909.67	4,382.24
Wind River	163,395.31	11,035.47	152,359.84	743,106.84	400,483.13	98,463.35	302,019.76
Blackfeet	54,065.51	12,185.08	41,880.43	222,594.11	60,300.05	54,108.14	6,191.91
Fort Peck	36,032.90	2,755.61	33,277.29	129,942.28	8,012.20	8,012.20	
Flathead	258,579.43	63,353.53	195,225.90	697,411.34	349,175.32	270,058.04	79,117.28
Fort Belknap	[1] 119,224.00		119,224.00	229,630.09	358.51	358.51	(7)
Crow	450,605.40	5,037.59	445,567.81	942,557.40	513,570.79	220,280.09	293,290.70
Walker River	[1] 45,276.00		45,276.00	57,130.31			
Total of 17 principal projects	2,489,484.90	769,539.03	1,719,945.87	6,398,915.90	3,030,666.81	2,211,104.20	$19,562.61
Miscellaneous projects	[1] 1,909,016.90	31,996.82	1,877,020.08	1,649,301.92	(7)	89,254.78	(7)
Total of all projects	4,398,501.80	801,535.85	3,596,965.95	8,048,217.82		2,300,358.98	

[1] 5 per cent per year.
[2] 27,000 acres in white ownership not under supervision of bureau.
[3] $502,326.16 on pumping plant.
[4] $3,353.56 taken out of 1926 cost; nonreimbursable 1926 funds.
[5] The original estimates on these 3 projects were made by U. S. Reclamation Service.
[6] Preliminary surveys and construction work done by U. S. Reclamation Service.
[7] No data.

SCOPE OF FIELD WORK

In pursuance of instructions contained in letter of March 15 Messrs. Teele and Engle met at Phoenix, Ariz., March 22, and on March 23 went to Florence, the headquarters of the Florence-Casa Grande project, where they were joined on March 25 by Mr. Preston, he having been unavoidably delayed. By agreement of the advisers Mr. Teele was selected as chairman. After studying the instructions and giving consideration to the work to be done on each project a tentative itinerary was prepared. Instructions were issued March 22 by the Secretary of the Interior directing that the above-named persons should also make an economic study of the following projects of the Bureau of Reclamation, which had applied for an extension of time for the repayment of construction charges—Rio Grande, Yuma, Yakima-Tieton, Yakima-Granger, Yakima-Prosser, Okanogan, Milk River-Malta, Milk River-Chinook, and Grand Valley-Orchard Mesa.

The field work on the Bureau of Reclamation projects was carried on in connection with that on the Indian projects by arranging the itinerary so as to cover all projects with the least amount of travel and expenditure of time.

The method adopted in the prosecution of the work, both on Indian and reclamation projects, was to make a field inspection of the principal features of the irrigation system, and of farms and crops, in the company of the project manager; and examination of project maps, reports, and data and records on file in the project offices and to hold conferences with farmers, both Indian and white, and with business men and local officials, and where it was considered desirable or there was any demand for it to hold public meetings for discussion with the water users of their various complaints and problems. Conferences were also held with the Indian agency and the irrigation-project officials, as well as other employees on the reservation. To expedite the work whenever possible the conferences or hearings were held in the evening, thus leaving the day for the field inspections.

Supervising Engineer Holt of district No. 1, and Acting Supervising Engineer Blomgren of district No. 2 were able to be with the advisers on all of the projects in their respective districts. Unfortunately it so happened that the chief engineer of the Bureau of Indian Affairs was in irrigation districts 3, 4, and 5 at the same time as the advisers, but in other parts of the districts, so that Supervising Engineer Clotts of district No. 4 and Supervising Engineer Hanna of district No. 3 could not be with us during all of the time spent in their districts; and Supervising Engineer Robinson of district No. 5 was unable to meet us.

The following is the itinerary of the party while engaged on the field work:

ITINERARY

March 23–31.—Survey of Florence-Casa Grande project, Arizona (Indian).
April 2–12.—Study of Rio Grande project, Texas and New Mexico (Bureau of Reclamation).
April 14–16.—Survey of Colorado River Reservation project, Arizona (Indian).
April 17–24.—Headquarters irrigation district No. 4, Los Angeles, Calif.
April 26 to May 2.—Study of Yuma project, Arizona (Bureau of Reclamation).
May 4–6.—Headquarters irrigation district No. 4, Los Angeles, Calif.
May 9–10.—Survey of Carson Sinks allotments, Nevada (Indian).
May 11–14.—Survey Walker River Reservation, Nev. (Indian).
May 16–19.—Survey of Klamath Reservation, Oreg. (Indian).
May 21 to June 18.—Yakima, Wash., survey of Yakima Indian Reservation and Yakima Bureau of Reclamation projects, and work in headquarters of irrigation district No. 1.
June 20–22.—Survey of Colville Reservation, Wash. (Indian).
June 23–26.—Survey of Okanogan project (Bureau of Reclamation).
June 27 to July 3.—Survey of Flathead Reservation, Mont. (Indian).
July 5–10.—Survey of Blackfeet Reservation, Mont. (Indian).
July 12–14.—Survey of Fort Belknap Reservation, Mont. (Indian).
July 15–19.—Survey of Milk River project, Mont. (Bureau of Reclamation).
July 26–August 1.—Headquarters irrigation district No. 3, Billings, Mont.
August 2–4.—Survey of Crow Reservation, Mont. (Indian).
August 5.—Survey of Tongue River Reservation, Mont. (Indian).
August 8–11.—Survey of Shoshone Reservation, Wyo. (Indian).
August 14–27.—Headquarters irrigation district No. 2, Blackfoot, Idaho.
August 29–September 6.—Survey of Uintah Reservation project, Utah (Indian).
September 8–10.—Study of Grand Valley project (Bureau of Reclamation).

September 13–15.—Survey of Southern Ute Reservation (Indian).
September 17–October 13.—In Denver, Bureau of Reclamation office.
October 17.—Arrived in Washington, D. C.

After completion of the field work the advisers spent some time in an examination of data concerning the projects of the Bureau of Reclamation in the bureau's Denver office, after which they came to Washington, arriving here October 17, 1927, and began the preparation of the reports. First, the report on the Bureau of Reclamation projects, which was completed November 29, 1927, when work was begun on the report covering the irrigation projects of the Bureau of Indian Affairs.

While engaged on this work Messrs. Preston and Engle have maintained a general supervision of their regular work and have visited their respective jurisdictions occasionally as conditions seemed to demand.

GENERAL PLAN AND CONTENT OF THE REPORT

Inadequacy and inaccuracy of data submitted concerning some projects.—During the course of our work we have made an effort to examine all the important available data relating to the inception, history, legislation, engineering, construction, operation and maintenance, utilization, land ownership, water supply and water rights, soil fertility, economic conditions, availability of markets, cost estimates, costs and collections, and any other factors affecting the feasibility of the projects under consideration, as well as considerable data relating to the question of Indian irrigation in general.

We had not proceeded far with the field work until it was seen that there is a very wide diversity, in fact an almost total lack of uniformity in both the content or subject matter, and in the manner of preparation of the regular or routine reports of the various project engineers and supervising engineers. To a large extent each apparently has adopted the plan he most favors. Some things considered important, and hence included in the report of one, may be considered unimportant and therefore omitted from the reports of another. A still greater fault, and one that should receive corrective attention, is the tendency of many employees to overestimate, or overstate the facts in the preparation of data and reports, for the evident purpose of making conditions seem more favorable than they actually are. Also, in the reports and justifications relating to the various projects, it is frequently found that there are inconsistencies and generalities, in some cases to such an extent that one can place but little reliance on the data submitted. All this leads to great confusion and makes it practically impossible to satisfactorily compare one project with another.

In an effort to remedy this situation and to secure more reliable and consistent data and to have it presented in so far as possible after a uniform plan, the advisers prepared a questionnaire calling for the information that we consider necessary for a study and comparison of the projects. This was sent to each of the supervising engineers with the request that the data be prepared and submitted for each of the projects in their respective districts. The results in many cases were not satisfactory. In a few instances the data bore evidences of having been perfunctorily prepared and in one or two instances it is difficult to escape the conclusion that an effort was made to obscure rather than to depict project conditions with reasonable accuracy.

The replies to the questionnaires are a good index of both the knowledge of the engineer concerning his project, as well as of his idea of the relative importance of collecting and having at hand the data essential to gauge the degree of success or failure of the project. Although it is submitted the questionnaire calls for no data but what should be kept constantly on file and up to date, some engineers in submitting their answers complained of the amount of time required in original research. Some of the replies indicate that for some of the projects there is need for much more original research.

For only three of the projects was the data submitted so that it could be copied and incorporated in our report without the necessity for correction or revision. Had the data for all projects been as well prepared and presented as for these three projects our report could have been prepared easily in less than half the time it has required, and it would have been far more satisfactory.

In the preparation of the project reports as contained in Part II of this report an effort has been made by comparison with the notes of our field studies, comparison with data contained in reports, justifications, and congressional hearings, and other sources, and also by correspondence with project and supervising engineers, to clear up inaccuracies and inconsistencies, but in some cases the task

seemed hopeless, and it is not at all probable that we have succeeded to the extent desirable. The preparation of these project reports, and especially the clearing up of inconsistencies contained in much of the data submitted from many of the projects, has entailed a considerable amount of work, much of which would have been unnecessary if adequate and reasonably accurate data were regularly collected and compiled, as, judging from certain congressional enactments and from the congressional committee hearings for the past several years, it is supposed to be.

The preparation of this report would have been impossible without the assistance of Mrs. M. E. Stewart, Mrs. T. R. Willmett, and Mr. W. A. Walker of the Washington office. In addition to typing practically all of the report Mrs. Stewart and Mrs. Willmett have assisted Mr Walker in the compilation and checking of much of the data contained in section 3, and sections 6 to 17, inclusive, contained in the special project reports.

In extenuation of the inadequacy of inaccuracy of the data submitted from some of the projects, it should be borne in mind that some are undermanned and frequently with an underpaid and consequently inefficient and dissatisfied personnel.

Unlike the irrigation projects of the Bureau of Reclamation, which are all built and are operated and maintained under one basic law and under uniform or nearly uniform legislation and regulations based on the original reclamation law, each of the projects of the Indian Bureau has been built and is being operated and maintained largely under special laws relating to each project. Much of the earlier legislation, like much of the irrigation work for which it provided, was necessarily experimental. This would naturally be expected considering that the first irrigation activities on Indian reservations were begun as early as 1867 or 35 years before the general reclamation act under which the Bureau of Reclamation operates was passed. The necessity for much of the special legislation arises from varying conditions on the different reservations, and particularly because of previous treaties or agreements with the Indians.

The foregoing considerations make it desirable, particularly in a study of the financial features and the obligation of reinbursement of costs, to go quite carefully into the history of the various projects. Unfortunately the preparation of project histories apparently has been given but little attention by the Indian Irrigation Service, with the result that for only a very few of the projects have histories been prepared, or any historical data collected. Some years ago, a request was made by the Indian Bureau that all project and supervising engineers prepare histories of the projects in their charge, but apparently the instructions were complied with in only a very few cases. It would naturally seem that project engineers, for their own information and convenience, would prepare histories of their projects. In the few cases in which project histories have been prepared they are, for the most part, like the project annual and monthly reports and justifications, filled with generalities and inconsistencies, and contain but little reliable and definite information.

On some of the projects the management have little or no definite information concerning the legislation and appropriations affecting the project, and seem to think this a matter of little consequence.

In order to include and present in a uniform and orderly manner all the essential data necessary to a study of each of the active projects covered by this survey, the following outline was adopted and has been followed in the preparation of a special report for each project. These project reports constitute part 2 of this report, and in it the projects are taken up in alphabetical order. Part 1 of the report treats of those problems and conditions that are general in their nature and more or less applicable to all projects:

1. Recommendations.
2. Synopsis.
3. Digest of Legislation, Treaties, and Executive Orders.
4. History.
5. Location, Transportation, and Markets.
6. Reservation Lands and Allotments (Area, Classification, and Value).
7. Population and Indian Health Conditions.
8. Climate.
9. Topography, Soil, and Drainage.
10. Water Supply and Water Rights.
11. General Plan of Irrigation Development.
12. Summary of Project Works.
13. Area and Utilization of Arable and Irrigable Lands.
14. Principal Crops, Crop Yields, and Returns.

15. Economic Conditions Among Project Farmers.
16. Project Operation and Maintenance.
17. Construction and Operation—Maintenance Costs and Collections.
18. Project Defects, Problems, and Complaints.

As indicated by the outline for the special project reports, the recommendations of the advisers are contained in section 1. Section 2, the synopsis or summary, is a brief abstract of the data contained in sections 3 to 17, inclusive, and is an effort to present the salient facts pertaining to the project in such manner as to facilitate an understanding of the project by any one not having the time or inclination to go into the details.

Section 3 is a digest of the principal legislation and also treaties or agreements and executive orders pertaining to the reservation, a knowledge of which is necessary to an understanding of the project and its problems from the fact that in most cases each reservation is affected by special legislation.

Section 4, History, is for some projects necessarily very brief as little or no historical data was supplied in the questionnaire sent out or could be found in the files of the Indian Office.

Section 6, Reservation Lands and Allotments: In some instances all the data desirable concerning this subject is not available. Particularly is this true with respect to the sales of fee patent Indian land, as on most reservations no records or reliable estimates are on file concerning this matter.

Section 7, Population and Indian Health Conditions: This is a subject that has not received much attention heretofore in irrigation reports but which your advisers consider is a subject of great importance with respect to Indian irrigation projects as it is quite evident that on some reservations the lack of progress in agricultural activities is due in large part to the bad health conditions among the Indians.

Section 15, Economic Conditions Among Project Farmers: We were unable to secure as much definite data as desirable concerning this subject. It is believed efforts should be made in the future to secure data concerning this subject and to include it in reports and justifications.

Section 18, Project Defects, Problems, and Complaints: This is a discussion of the problems, defects, and complaints peculiar to each of the projects and is based upon the observations of the advisors during the course of their field examination and upon complaints or statements made by agency and project officials and water users, both Indians and whites. The other sections included in the report are such as are generally included in all reports of this kind.

By instructions supplementing instructions contained in letter of March 15, 1927, we were directed to prepare a history of each of the projects under consideration. It is regarded as fortunate, however, that these instructions were later cancelled with the statement that the project histories would be dispensed with, although we have considered it necessary in the study of each of the projects to have before us for reference a brief historical sketch of each of the projects, and an effort has been made to prepare such a sketch. It is realized that these are, in most cases, very incomplete and unsatisfactory The preparation of a complete and reliable history for each project is a work that would require much more time than the advisors felt they would be justified in devoting to it.

RECOMMENDATIONS

In view of the foregoing it is recommended:

1. That complete project histories, prepared in so far as possible in conformity with a uniform outline as to order and subject matter to be included, be prepared for each of the Indian irrigation projects by some one who can do the work in a creditable manner.

2. That after these project histories are prepared, they be brought up to date each year by the project annual report.

3. That the Indian irrigation service adopt an outline, uniform as to order and content, for the preparation of both monthly and annual reports and insist that reports be carefully prepared in conformity to the outline and directions.

4. That greater efforts be put forth to secure reasonable accuracy and consistency in the irrigation project data submitted in reports and justifications, and to this end, it is recommended:

5. That on occasions, and without advance notice to project engineers, crop surveys of the lands operated by Indians, by lessees, and by non-Indian owners, be made by an engineer or surveyor not regularly connected with the Indian irrigation service.

THE INDIAN PROBLEM

It is believed that it will be profitable, if, as a preface to the study of the specific problems under consideration, we review very briefly a few of the more important phases of our general treatment of the so-called Indian problem.

The Indian problem, which reduced to its simplest form is, "what shall be done with the Indian," first presented itself on that memorable day more than 400 years ago when the great Italian navigator landed on the shore of San Salvador.

Condition of primitive Indians.—In their primitive condition the Indians of the various tribes with but few exceptions were savages, eking our a precarious existence by hunting and fishing. Although their wants were few and simple, and easily supplied; hunger was almost a universal habit, and satiety a memorable event celebrated by dancing and merriment. Whole tribes were frequently decimated by disease or famine. There was almost constant warfare between neighboring tribes. Each tribe held the territory it claimed only so long as it could maintain its claim against the aggressions of its neighbors. Life for them was hard and cruel, with little or nothing in the way of diversion to break the hardship and suffering of a life of exposure to the elements, and to disease. Due to exposure, disease, and frequent famine, they grew old quickly; and died young.

As the white population advanced the country became unfit for the Indians' mode of life. The wild-animal life, upon which he depended principally for subsistence and clothing, fled into the forests, and the Indian followed.

But there came a time when the advancing tide of immigration overtook and engulfed the Indian and surrounded him on all sides. The removal policy was no longer practicable. There was no place left where he might go.

Indians' title to America.—In planting his flag upon the land he had found and claiming it in the name of the King of Spain Columbus was simply acting upon the theory or principle of international law, universally accepted then as well as now, that a land without organized government is the prize of him who discovers it. To the sovereign belonged dominion; to the native only the right of occupancy. The fee or actual ownership was in the sovereign. In two ways only could the Indians' limited title of occupancy be extinguished—by conquest or by purchase; but the sovereign or conqueror was the only party who might be the purchaser.

Such was the theory or principle, accepted then as now, by all European nations, and the United States later adopted and followed the same principle.

The character of the Indian title was established for all time in 1823 by a decision of the Supreme Court rendered by Chief Justice John Marshall, from which is quoted:

"* * * The potentates of the Old World found no difficulty in convincing themselves, that they made ample compensation to the inhabitants of the new by bestowing on them civilization and Christianity in exchange for unlimited independence * * *. The United States, then, have unequivocally acceded to that great and broad rule by which its civilized inhabitants now hold this country. They hold and assert in themselves the title by which it was acquired. They maintain, as all others have maintained, that discovery gave an exclusive right to extinguish the Indian title of occupancy, either by purchase or by conquest, and gave also a right to such a degree of sovereignty as the circumstances of the people would allow them to exercise. The power now possessed by the Government of the United States to grant lands resided, while we were colonies, in the crown or its grantees. The validity of the titles given by either has never been questioned in our courts. It has been exercised uniformly over territory in possession of the Indians. * * *"

Indian policy of the Colonies.—During the colonial period of our history, the treatment accorded the Indians was largely a local matter, and usually patterned after the dictates of expediency. There is apparently much truth for the witticism once expressed by Hon. Rufus Choate, "The Pilgrims first landed on their knees and then on the aboriginees."

Early Indian policy of the United States.—President Washington, in addressing the Iroquois in 1790, thus expressed the policy of the United States with respect to the Indians: "The General Government will never consent to your being defrauded but will protect you in all your just rights." (Am. State Papers, Indian Affairs, vol. 1, p. 142).

It was the hope of many during the infancy of our Nation that the Indian problem would solve itself by an amalgamation of the two races. President Jefferson, in his second message to Congress thus expressed this hope: "* * * The ultimate point of rest and happiness for them is to let our settlements and

theirs meet and blend together, to intermix and become one people. Incorporating themselves with us as citizens of the United States is what the natural progress of things will bring on; it is better to promote than to retard it."

That the amalgamation of races has not turned out as hoped is indicated by the fact that out of an Indian population in the United States to-day of 354,940, there are 180,000 full bloods, and the rate of amalgamation is said to have been slowing up since the passing of the pioneer days.

In the report of the Committee on Indian Affairs of the United States House of Representatives, submitted in 1830, dealing with the constitutional right of Congress to remove Indian tribes from the domains claimed by them, to the Indian Territory, it was said:

"The Indians are paid for their unimproved lands as much as the privilege of hunting game upon them is supposed to be worth, and the Government sells them for what they are supposed to be worth to the cultivator. * * * To pay an Indian tribe what their ancient hunting grounds are worth to them after the game is fled or destroyed as a mode of appropriating wild lands claimed by Indians has been found more convenient, and certainly it is more agreeable to the forms of justice, as well as more merciful, than to assert the possession of them by the sword. Thus the practice of buying Indian titles is but the substitute which humanity and expediency have imposed in place of the sword in arriving at the actual enjoyment of property claimed by the right of discovery and sanctioned by the national superiority allowed to the claims of civilized communities over those of savage tribes." * * *. (21st Cong., 1st sess., H. Rept. No. 227, February 24, 1830.)

Government unable to enforce early humane policy.—The policy of the United States Government toward Indians as outlined in the foregoing was eminently fair and just, and far in advance of the policy of any other nation of that day. It was so far in advance of custom and belief that it was considered idealistic and unworkable by so many of the people, particularly those of the frontier who came in contact with the Indian, that the Government was unable to enforce it.

On the one side was the white man coming to the New World to escape oppression and build a new home; on the other was the Indian making no use of the domain but to hunt and fish. It was inevitable that there should be conflict. The conflict was characterized by intense racial hatred.

Within a few years after the first settlements along the Atlantic coast the breach between Indian and white had so widened that even the Puritans considered the Indians the "spawn of hell" and encouraged their extirpation in the spirit of the Old Testament. (The Puritan in Holland, England, and America, Campbell.)

The Southern States and the Indian problem.—It is a matter of history that Alabama threatened to secede from the Union if the United States statutes regarding Indians were enforced, and that Georgia twice nullified the decrees of the Supreme Court. (The Supreme Court in United States History, Warren. The Life of John Marshall, Beveridge.)

Finally the Indian problem of the Southern States was solved in large measure by the "peaceful" removal of most of the Indians to the Indian Territory. It is stated by some historians that 9,000 troops of the Regular Army "assisted" the Indians in moving.

Early treatment of the Indian problem.—The quickest and easiest solution of the Indian problem and the one early adopted by the Caucasians was to kill or drive out the Indians. That was the method adopted by our early European ancestors soon after the first English settlements were established in America. As a result of this ruthless policy of extermination thousands of Indians originally living in Alabama, Georgia, Ohio, Indiana, Illinois, Kentucky, Michigan, and other sections of the eastern United States were either killed or driven westward.

As the ever-increasing tide of civilization and settlement advanced toward the West it in time came in contact with the crafty, warlike Indian tribes of the Great Plains and the Rocky Mountain regions. The task of affording adequate protection for our widely scattered and sparcely peopled frontier settlements was soon found impossible of performance by our Army. Moreover, there had been crystallizing on the part of the general public, a deep and growing conviction that the Indian is in reality a human being, that he has rights which human society and our Government are in duty bound to recognize and respect, and in consequence a revulsion of feeling had grown up against the earlier policy of ruthlessly driving the Indian out of the country or exterminating him. As a matter of fact there was no place left where he might be driven.

The reservation system.—As a result the reservation system was adopted. The various tribes or bands of Indians were brought together, forcibly if necessary,

and placed on tracts of the public domain that were set apart and reserved for their use and occupancy. On these reservations the Indians were required to remain, and it was stipulated by the Government in turn that they should not be molested. The reservation system was in reality a war measure, adopted for the obvious reason that it was far easier to watch and control the Indians by concentrating them within a few comparatively small, well-defined areas than to permit them to roam over the country at large.

But many of the tribes strenuously objected to the reservation system. It was a severe restraint on the wild freedom they had enjoyed from time immemorial. Moreover, the Indian wars and the encroachments of the white settlers had in many instances practically driven away or exterminated the wild animal life or game upon which the Indians depended for subsistence. This is practicularly true of the American bison, sometimes called the buffalo, which at one time literally covered the Great Plains and supplied food, clothing, and shelter for many of the Indian tribes. This animal was practically exterminated within a few years by the professional buffalo hunters of the early pioneer days, who slaughtered these animals by the million for their skins.

If the wild animals on which he depended for food were not to be had on his reservation, and the Indian in consequence found himself hungry, cold, and naked, he did what any other creature—either human or animal—would do under similar circumstances; he left his reservation and went in search of food. The task of rounding up and returning to their reservations these runaway Indians was thus added to the other duties of our small western army.

Many of our Indian wars resulted from the refusal of certain tribes to remain on their reservations; they invariably based their refusal on the claim that their reservations were too small or did not afford sufficient food for them.

The ration system.—As a result of the practical impossibility of keeping many of the Indian tribes within their reservation, and the consequent increase in the number of Indian uprisings or rebellions, President Grant, during his administration, sent out a commission composed of both civilians and Army officers to make a study of the Indian problem. The commission reported that many Indians were virtually starving and that this was a principal cause of Indian hostilities. It is said that the commission concluded from its investigations that it was costing the Army at the rate of a million dollars each to exterminate the Indians, and that in consequence it would be far less expensive, even as a business proposition, to civilize them. It was necessary however to feed them while the civilizing process could be tried, so the ration system was instituted.

The ration system, although a necessity at the time, for keeping the Indians on their reservations and pacifying them, was the greatest curse with which the Indians were ever afflicted, as it speedily converted a race of bold, independent, and self-reliant warriors into a race of beggars and parasites. Many who have given thought to the Indian problem are of the opinion that the ration system, in less than one generation, did more to ruin the Indian then any other treatment they ever received at the hands of the whites.

The Indian problem of to-day.—The Indian problem of the present day is to make of the Indian an intelligent, self-supporting, law-abiding citizen of our country. In view of his present condition, the problem consists principally and essentially in improving his health, educating him, and in some manner inculcating in him habits of industry and economy. Like many problems, it is easy to state it, but not so easy to provide a satisfactory solution. We have demonstrated that we can improve his health and educate him, but as to inculcating the habits of thrift and industry, we have not been entirely successful as yet. It is true that by congressional enactment the Indian has been made a citizen, but in the vast majority of cases, he is so only in name; the law has not changed his nature.

It is becoming increasingly apparent, we believe, on the part of those who have given the subject any consideration, that the principal difficulty about the Indian problem is that we have failed to properly appreciate its magnitude and complexities. We have expected the Indian to take within a generation or two the same step in progress that requried our own race a hundred generations to take.

Some difficulties of the problem.—In many instances the Indian problem is greatly complicated, if not rendered entirely impossible of solution, by the fact that changing economic conditions brought about by the settlement and development of the country, or other fortuitous circumstances, has relieved the Indian of the necessity of working. He is living from the rentals of his property or other unearned money. Under such conditions, how is he to be taught the habits

necessary to good citizenship, such as industry, economy, thrift and temperance? The habits of indolence, improvidence, profligacy, debauchery and intemperance are growing stronger day by day. For many of those Indians, such as the Yakimas, who are living from their land rentals, and the Klamaths, who are living from their timber sales, there is but little hope for the future. Some day their tribal funds will be exhausted, they will have received fee patents and sold their allotments, and squandered the proceeds; then many of them, as lazy, shiftless beggars will again come back on the bounty of the Federal or State Government. This class of Indians—the idle rich—present a difficult and critical problem. Some of the ablest superintendents in the Indian field service with whom this question was discussed are of the opinion that the best thing that could happen to them would be to give them all their property now, let them squander it, after which they would have to go to work. We are inclined to agree with this proposal. It is evident that the longer they are permitted to live without work. the fewer of them there will be who will be able to support themselves when they finally are thrown on their own efforts.

This is, of course, a condition for which the Indian Bureau is not responsible, as under existing law, as we understand it, land rentals and proceeds of timber sales can not be withheld from Indians.

As with the great body of our own race, wherever we find the Indian faced with the necessity to work and his work bringing him a reasonable return, whereever we find him busy, we find him fairly well contented, docile, and enjoying some degree of real happiness. Wherever we find him idle, we find him discontented and inclined to be unruly and intemperate.

RECOMMENDATION

It is recommended that consideration be given to the matter of securing such legislation as necessary authorizing the leasing of Indian land without the consent of the owner and withholding from Indians, where deemed advisable for their best interests, land rentals and other moneys.

THE INDIAN BUREAU—A SKETCH OF ITS ORGANIZATION AND ACTIVITIES

The organization created by our Government for the purpose of working out a solution of the Indian problems—that is, making intelligent, self-supporting, and law-abiding citizens of the Indians—is the Bureau of Indian Affairs. Constitutional provision for this organization and its work is contained in the third clause, section 8 of article 1 of the Constitution, which confers upon Congress power "to regulate commerce with foreign nations and among the several States and with the Indian tribes." The act of Congress of August 7, 1789 (1 Stat. 49), creating the War Department placed the direction of Indian affairs under the Secretary of War. By act of Congress of July 9, 1832, the President was authorized to appoint, by and with the advice and consent of the Senate, a Commissioner of Indian Affairs "who shall, under the direction of the Secretary of War, have the direction and management of all Indian affairs and of all matters arising out of Indian relations." In 1849 this law was amended, transferring the Office of Indian Affairs to the newly created Department of the Interior.

The organization of the Office of the Bureau of Indian Affairs, located in the Interior Department Building at Washington, consists of four major divisions: Land, Administrative, Finance and Purchase; and also Medical, Forestry, and Irrigation Divisions. Every question of administration relating to Indians comes to the Indian Office for consideration. These questions relate to land, health, education, industrial activities, irrigation, purchase of supplies, handling the accounts of the various field officials, and other activities.

There are approximately 350,000 Indians in the United States, according to the 1926 enumeration. The Indian property is valued at approximately one and one-half billion dollars. The Indians own approximately 71,000,000 acres of land, of which about 39,000,000 acres has been allotted to individuals. The Indian Office is charged with the administration of the affairs of all restricted Indians throughout the United States.

There are 193 different tribes or bands of Indians speaking some 60 different languages. The Indian population is scattered over approximately 200 Indian reservations ranging in size from plots of a few acres to extensive reservations, the largest of which is the Navajo Reservation of Arizona and New Mexico embracing an area of about 8,000,000 acres, which is larger than several of the States of our Union. There are 119 field offices or jurisdictions including agencies

or superintendents of reservations and schools. There are regularly about 200 employees in the Washington office and about 4,900 in the field.

For some years past the annual congressional appropriations from the United States Treasury have ranged from $12,000,000 to $14,000,000. Usually about $1,000,000 of this is for fulfilling treaty obligations; approximately $2,000,000 is is reimbursable and the remainder—$9,000,000 to $10,000,000 annually—is a gratuity appropriation, that is, an appropriation not subject to repayment. About $6,000,000 annually is expended for education.

It is reported that about 24,000 Indians have tuberculosis and approximately 30,000 have trachoma. About $800,000 annually has been expended during recent years for health work. There are 96 hospitals with 170 physicians and 146 nurses engaged in the health work of the Indian Bureau.

Since 1871 Congress has appropriated approximately $500,000,000 for the support, education, and civilization of Indians. The Indians, by constitutional authority and by act of Congress, have been placed in charge of the Secretary of the Interior. By authority of law the Secretary of the Interior delegates the administration of his guardianship activities largely to the Commissioner of Indian Affairs, who is the executive head of the Bureau of Indian Affairs.

The Commissioner of Indian Affairs has direct—in a large measure, almost personal—supervision over the affairs of all restricted Indians. These live under the widest possible variety of conditions, and represent every degree of civilization, ranging all the way from pagan barbarism to men and women of the highest type of culture and refinement. As to their financial condition, they range from beggars to millionaires.

As indicating the variety and extent of the activities of the Bureau of Indian Affairs, attention is called to the following tabulation, "Summary of Appropriations by Purposes of Expenditure" adopted from Service Monograph No. 48, by the Institute for Government Research:

Purposes	Fiscal years			
	1903	1913	1923	1928
Annuities	$187,617.51	$44,100.00	$44,100.00	$44,100.00
Pay of employees	176,248.99	151,220.00	155,220.00	216,266.00
Education	3,771,678.72	3,753,555.00	4,574,445.00	6,495,700.00
Irrigation and water supply	300,000.00	1,133,062.62	1,888,007.00	1,736,625.00
Hospitals	25,000.00	85,000.00	376,000.00	643,500.00
Expenses in connection with affairs of Five Tribes and Osage	310,000.00	215,000.00	395,000.00	247,000.00
Support and civilization	2,428,018.58	1,690,846.00	2,931,030.00	2,129,454.00
Other purposes	2,419,631.03	2,714,374.86	3,467,294.17	3,478,840.00
Total	9,618,194.83	9,787,158.48	13,831,096.17	14,991,485.00

The Indian Bureau and its critics.—The Indian Bureau, almost from the date of its organization, has been almost constantly under criticism. In a lengthy report reviewing Indian relations the committee of the House of Representatives (1st sess. 23d Cong., 1834) characterized the administration of Indian affairs as being "expensive, inefficient, and irresponsible." Much criticism of this sort still persists. Much of the criticism of the bureau is known to be instigated and fostered by people whose interests would be advanced by having the bureau abolished and the Indians turned loose. Some criticism is from professional agitators, who are opposed to all governmental restraint, whether the Indian or of themselves. All criticism, however, can not be condemned as being inspired by selfish motives or interests, as it is but natural that there should be honest differences of opinion among thoroughly honest and conscientious people about a problem of such magnitude and difficulty. Among these honest and sincere critics of the Indian Bureau and its policies may be found people advancing all sorts of proposals, ranging from that of placing the Indian under strict military rule, to that of our surrendering to him the entire continent and returning to Europe whence we came.

Presumably as a result of the vast amount of criticism that has always been directed toward it, the Indian Bureau has been forced into an attitude wherein it is constantly on the defensive and in consequence of this attitude is apt to be resentful of all criticism of every kind except favorable criticism, as destructive. This very attitude is calculated to arouse suspicion that all is not well, and in

turn, engender more criticism. As a result a large part of the bureau's energy and time is expended in opposing criticism. In opposition to this growing criticism—which to a large extent has its foundation in a lack of appreciation on the part of those interested of the innumerable difficulties and inexplicable perplexities involved in making of the Indian an enlightened, useful, and self-supporting citizen—some officials and many employees of the bureau apparently convinced that facts are not always sufficient to meet criticism, have at times shown a tendency to resort to fancy and propaganda, rather than actual facts.

Among some Indians, wonderful progress has been made toward civilization. While much has been accomplished, much more remains to be accomplished. Jubilation over past successes may well be tempered by a realization of the difficulties yet to be met.

Some defects and difficulties of the Indian Bureau.—In our opinion the principal defects that adversely affect the work of the Indian Bureau are the following:

1. Inadequate authority to act as guardian. The bureau is held responsible for the welfare of the Indians but in many instances has not the authority to enforce obedience to measures necessary for such welfare. It is in the position of a guardian, who, although without authority to enforce obedience to his commands because of the interference of others, is nevertheless held responsible for his wards behavior and welfare.

2. Too much centralization of authority in the Washington office. The authority to decide questions lies with persons who seldom or ever see an Indian or a reservation, and are without personal knowledge or what they are doing. The officials who know the Indians and local conditions have no authority and the officials who have the authority do not know the Indians and the local conditions.

3. Inadequate salaries, lack of recognition of faithful and efficient service, and consequent excessive turnover in employees, with the inevitable result that many of the employees are inexperienced, inefficient, and incompetent.

4. A tendency to magnify successes and minimize failures by optomistic reports which apparently has had the result of creating in the mind of the interested public a misconception of the difficulties involved in the Indian problem.

5. To continue doing things in the same way.

RECOMMENDATIONS

1. That superintendents be granted much more authority than they now have.

2. That there be periodic transfers of employees from the field to the Washington office and vice versa, so that office employees may have a knowledge of field conditions.

3. That salaries be placed on a par with these paid in other branches of the Government service. As a matter of fact, the salaries in the Indian Service should be higher than in other branches of the Government service, because of the unsatisfactory conditions incident to employment in the field, such as long hours, isolation, undesirable housing conditions, association with a primitive people, and constant exposure to tuberculosis and trachoma which are especially prevalent among many Indians.

INDIAN IRRIGATION SERVICE ORGANIZATION

It was not until 1902, after an expenditure of $495,000 in irrigation works, that provision was made for an engineering organization at anything like adequate salaries. At that time, provision was made for "pay of eight Indian inspectors, one of whom shall be an engineer competent in the location, construction, and maintenance of irrigation works, at $2,500 per annum."

Prior to that time the irrigation construction and operation and maintenance work was carried on under the direction of the superintendents of the various reservations with occasional assistance from a local engineer temporarily employed, and was, as stated in the annual report for 1912 of the Commissioner of Indian Affairs, "inharmoniously and wastefully conducted."

In 1906, after an expenditure of $830,000 from the general fund "Irrigation Indian Reservations" and about the same amount from special project appropriations, provision was first made for a chief engineer at the modest salary of $3,500.

The Indian irrigation service, or more correctly, the irrigation division of the Bureau of Indian Affairs, as now organized, is one of nine divisions into which the bureau is divided for administrative purposes. The organization in the Washington office consists of a chief of division, chief engineer, field cost accountant, two

clerks, and one stenographer. The chief of the division is an attorney, and in fact is the only attorney regularly employed by the Indian Bureau who is familiar with irrigation law. In view of the innumerable complex problems relating to irrigation and water rights that are constantly presenting themselves, his time is occupied principally with the legal phases of the work, leaving him little time for administrative duties which must largely be delegated to his assistants.

It is reported that the chief engineer and the field cost accountant each devote about half of their time to field work. There is also an assistant chief engineer. He, however, has not performed the duties of that position for several years, but has been in charge of construction work on the Gila River or Pima Indian Reservation in Arizona.

Since 1912, for administrative purposes the arid west has been divided into five irrigation districts, each in charge of a supervising engineer. Each of the supervising engineers maintains an office with a small staff of assistants at some centrally located point in his district. These district organizations and the extent of their work are indicated by the following tabulation:

	District 1, Yakima	District 2, Blackfoot	District 3, Billings	District 4, Los Angeles	District 5, Albuquerque
Supervising engineers	1	1	1	1	1
Office engineer				2	
Chief clerks and S. D. A	1	1	1	1	1
Stenographers		1	1	1	½
Clerks	5	3	1	5	1
Employees in district offices	7	6	4	10	3½
District office salaries and expense for 1927	$5,944	$9,976	$11,396	$18,268	$11,812
Field employees in district (regular)	69	77	103	276	44
Expenditures for 1927	$321,352	$201,040	$263,356	$875,300	$123,646
Collections for 1927	$238,381	$106,256	$135,712	$44,743	$777
Total expenditures	$1,784,694				
Total collections	$525,869				

The supervising engineers formerly reported to the chief engineer, but for the past three years have reported to the Commissioner of Indian Affairs. They are responsible to the Commissioner of Indian Affairs, to the chief engineer, and to the chief of the irrigation division for the work in their respective districts. On each of the larger projects of 10,000 to 100,000 acres is a small project organization headed by a project engineer who reports to the supervising engineer. Those projects that are too small to justify the employment of a project engineer are usually in charge of a foreman or water master, or the very small ones may be operated by the reservation superintendent or farmer, or by the Indians themselves with such assistance and supervision as the supervising engineer can give. A large part of the work of the supervising engineers consists of surveys and investigations necessary to the protection of the Indian water rights. The work of the supervising engineer and of the project engineers on the large projects involves everything in connection with irrigation from preliminary investigation to construction and operation and maintenance.

It is evident from a comparison of the Indian irrigation service organization with any organization, either Government or private, doing a similar class of work, and comparable in magnitude, that the organization is wholly inadequate for properly doing the necessary work. In addition to being under-manned and inefficiently organized, the engineering employees receive the lowest salaries in the Government service. An examination of the field and office records on nearly all projects and in the Washington office makes the inadequacy and inefficiency of the organization still more apparent. In many instances, conditions are rapidly approaching a chaotic state as the result of failure to collect and record necessary data and information. Not infrequently projects or extensions have been built without adequate preliminary investigations to determine water supply and irrigable areas, such investigation having apparently been neglected because qualified men have not been available to make them, or they have been dispensed with as a matter of economy. Such economy, however, will turn out to be "economy" of the most expensive possible kind.

A business of the magnitude here involved, and as diversified as it is, requires the services of the skilled and experienced engineer, the accountant, the able and experienced attorney, the cost keeper, and a sufficient number of clerical assistants, both in Washington and in the field, to compile and keep the proper data, and to

properly coordinate and manage the business. We find numerous problems in the field involving the necessity for legal advice that have been the source of trouble and confusion for years. There are no legal advisors in the field, and the one attorney in the Washington office is so loaded down and encumbered with numerous duties that he can not possibly and should not be expected to do the legal work arising out of a business of such magnitude. Because of the lack of adequate and able legal advice alone, the Government has lost, and will continue to lose many thousands of dollars of reimbursable money expended.

Failure on the part of the Indian Bureau to comprehend the importance, the magnitude, and the difficulties of the irrigation activities, is the chief cause of the trouble, and is exactly what might be expected as a result of the present system whereby this work is directed by a bureau primarily interested in education and welfare work, and in consequence looking upon irrigation as a relatively unimportant incident to the larger and more important activity of the bureau.

The chief engineer with headquarters at Washington nominally is in charge of all the engineering activities of the service. He maintains no engineering aids or assistants to help him with the work. The Assistant Chief Engineer's time for the past 10 years has been spent as a construction engineer on work almost exclusively connected with the Florence-Casa Grande project, and at the present time he is in active charge of the construction of the Coolidge Dam with headquarters at the dam site.

Practically all the engineering work is accomplished through the five supervising engineers, located at Los Angeles, Yakima, Billings, Blackfoot, and Albuquerque.

Due to the absence of an adequate organization directly under, and in close touch with the chief engineer, the work performed by him is more in the nature of that of a consulting engineer. This has had the effect of building up the five supervising engineers' offices into five independent organizations instead of each being a part of one engineering organization. Under this sytem we find that there is no coordination and standardization of the work. We find that each of the supervising engineers has charge of the designing of structures for his district and that there are almost as many general types of designs as there are supervising engineers. Plans prepared by the supervising engineers are supposed to be approved by the chief engineer, but due to the lack of a central organization to promptly check and study such plans, the chief engineer can at the best only give them a general examination, as there are many other administractive matters requiring his attention as well as the necessity for his spending a part of his time in the field each year, often several months at a time. Through the lack of prompt action, we find that structures are often built by the project organizations before the plans are approved. There is no coordination of the work between the supervising engineers, and no attempt at standardization of structures, and uniformity in operation and maintenance practices. The only exception to this was found on the San Carlos-Casa Grande project where the designs of certain structures were prepared under the direct supervision of the assistant chief engineer.

On the Casa Grande project we find a class of structures being built that belong to the experimental class. Several of these structures are of considerable magnitude. During the past 25 years, standard types of structures have been worked out to meet practically every engineering problem in irrigation. We believe it is not good policy, particularly on the part of the Government, to make radical departures from standard and approved types and methods upon so large a scale as we find on the Florence-Casa Grande project.

In the building of structures not in accordance with standard designs, contractors will naturally bid more per unit because of the unknown elements of cost. Furthermore, an appropriation by Congress for construction purposes presupposes that good and accepted engineering principles will be used in its expenditure. Radical designs are in the nature of experiments and the Government engineer should be loath to adopt them unless public money is appropriated for the specific purpose of experimenting.

The engineering branch of the irrigation division is not so organized as to secure the greatest efficiency. An engineer may be well qualified for a certain class of work, but mediocre on other classes of work. It is impossible where each project or each supervising engineer's office is doing its own designing and engineering work to take advantage of these expert qualifications of various members of the entire staff as it is in a more compact organization. It is therefore advisable to build up a stronger central organization, eliminating the intermediate offices, obviating lost motion and duplication with consequent loss of time, and bringing the central office in closer touch with the projects.

The Bureau of Reclamation during its early development operated under very much the same system as that under which the Indian irrigation service now operates. It encountered the same problems, and in 1913 a study was made of the methods of conducting the field and office work, with a view to economies of administration, with the result that an office was established in Denver, which for a time was in charge of the chief of construction, and later, the chief engineer. With the establishment of the Denver office, the supervising engineers' offices were abolished and the work of these offices concentrated in the Denver office. Gradually this office has built up a capable and efficient engineering staff that is far superior to the former organization. It gives the projects the services of a well-trained staff that would be impossible for the individual projects to obtain in any other way.

It is our conclusion, providing the Indian irrigation service will make the salaries of their employees comparable to those paid for similar services in the Bureau of Reclamation, so as to secure a higher efficiency, than the plan worked out by the Bureau of Reclamation should be adopted. This would mean that the officer of the supervising engineers would be abolished, and the chief engineer would be located in the West—preferably in Denver—where he would be near the center of the work. As both bureaus are under the same department, certain features of the Indian work might well be performed by the Bureau of Reclamation. Some of its activities like engineering, designing, construction, investigations, and the field legal work, we believe could well be performed by or transferred to the Bureau of Reclamation. The chief engineers of both bureaus being located at the same place, a closer cooperation would be brought about with a saving in cost to the Indian Service, and a higher type of work accomplished. The many activities relating to the operation and maintenance, leasing of lands, colonization, and collections, should be coordinated under a chief engineer centrally located, with a sufficient organization to properly handle the work.

As suggested above, it is believed that this plan would be feasible only in the event that the efficiency and morale of the present organization are increased by making the salary scale conform to that of the Bureau of Reclamation for similar work. At present, project managers in that bureau receive salaries ranging from $3,400 to $4,600, while in the Indian Service, the salaries range from $2,400 to $3,600. Moreover, a project manager in the Bureau of Reclamation is not required to do any designing or construction work.

The attorney as necessary as the engineer.—Every enterprise founded under legislative authority and dealing with the public must conform to certain prescribed legal methods of transacting business. It is the practice of every good management of a business enterprise to have competent and ample legal advisers to assist the management in keeping the business upon a sound basis. Such a policy saves money by avoiding lawsuits or by carrying on the business in a manner that will permit its rights to be clearly and definitely determined in case of litigation.

Lawyers are as necessary to the construction of irrigation projects as engineers. The lawyer and the engineer, going hand on hand, are needed if safe and successful projects are to be built.

The field offices of the service have no regular legal advice other than that which can be given by the one attorney from the Washington office, with the exception of one attorney now temporarily employed to do the legal work relating to the Florence-Casa Grande project. Numerous questions are bound to arise in the development of an irrigation enterprise and the engineers require constant legal advice. Under the present system questions relating to legal matters are taken up by correspondence with the Washington office and frequently years elapse without any solution of the difficulties. It is impossible for an attorney sitting in the Washington office to have the same understanding of the relative importance that local conditions may have upon a legal matter that might be obtained in a few hours on the ground. Considerable complaint is heard in the field, from employees, and Indians and white water users to the effect that it is almost impossible to obtain a prompt decision from the Washington office. One of the most common complaints is that many questions are left unadjusted. Prompt action is essential in many instances, but is impossible under the present system.

All this has led the field men to the point that they avoid submitting many legal problems to the Washington office and assume the responsibility of deciding such questions themselves. On one project we found a white man was receiving certain benefits from the Indian Irrigation Service without paying for the same and when the project official was asked why a contract had not been drawn to

cover the matter, he replied that if he took the matter up with the Washington office it would be under correspondence for the next 10 years. One case for the adjustment of an irrigation claim has been pending since 1908 and is still undecided after 20 years. The correspondence in this case involves numerous letters between the field and Washington offices as well as special reports.

On another project operation and maintenance costs covering a number of years and now amounting to $45,000 are involved, certain whites having enlarged a portion of the Indian irrigation system without the Government being properly protected by a contract. To recover the amount will now involve a law suit with the prospect of losing a large part of the cost. All this could have been avoided with proper and adequate legal advice in drawing a contract at the time of enlargement. On the Crow and Wind River projects the Government will lose considerable of the moneys spent in developing the irrigation system upon lands purchased by the whites, all of which would have been saved if the service had had sufficient legal advisers and they had required the purchasers to execute proper repayment contracts.

The Indian Service is dealing with water rights on the reservations in the west and these water rights are valued at many millions of dollars and the lands to which these rights are appurtenant are scattered over 13 or 14 States having different water laws that must be complied with, to a greater or lesser extent. While our studies were confined to the larger projects, it is known that the value of the water rights per second-foot upon some of the small projects are much greater than on the larger ones. On one small reservation in southern California the water rights are valued at $150,000 per second-foot. Your advisers found that in some cases the field men were seeking legal advice from some attorney friend outside the Indian Service.

In the Washinton office there is but one attorney, who is also the chief of the irrigation division, engaged on the legal work arising from all the irrigation activities of the Indian Bureau. We were informed by a leading attorney who is a specialist in irrigation law, and who is well acquainted with the legal work of the Indian Service, that the attorney handling the legal work of the Indian irrigation service in the Washington office is doing as much work as six attorneys ordinarily would be expected to do. Contrast this condition with the legal staff of the Bureau of Reclamation, composed of 5 in the Washington office, 3 in the Denver office, and 6 field district counsels, who visit the projects frequently and become intimately acquainted with the legal problems involved. It may be argued that the Bureau of Reclamation has a greater financial interest involved than does the Indian Service and should therefore require a greater legal force. The requirements must be based on the necessities of the case. Viewing the matter in that light we find that the Indian Service has a greater number of projects than the Bureau of Reclamation. Many of them are small, it is true, but their legal problems, as well as their engineering problems, are frequently more intricate than those of the larger projects. The Bureau of Reclamation is dealing with development under general laws covering all projects, while the Indian irrigation service is dealing with developments under a multiplicity of laws.

Two bureaus of the Interior Department engaged in land reclamation.—Two bureaus of the Department of the Interior of the Federal Government are engaged in reclamation work: (1) The Bureau of Reclamation, upon which devolves the irrigation development provided for by the act of June 17, 1902, or the reclamation act, and supplemental legislation; and (2) the Bureau of Indian Affairs, which is engaged in irrigation work as an incident to its Indian welfare work.

We thus have the Bureau of Recalamtion building irrigation projects for people of our own race, and the Bureau of Indian Affairs building irrigation projects, supposedly for Indians, but in most instances actually for the benefit of people other than Indians. As the natural result of the Indians having been given much more land than they can farm, and the consequent necessity for their leasing or selling it, these so-called Indian projects are in reality no different than the reclamation projects.

As a result of its extensive operations and the broader policies respecting employment, the Bureau of Reclamation has drawn into its service a large number of engineers of wide experience, and has built up a well qualified and efficient organization with many experts in the various branches of irrigation engineering, such as preliminary investigation and location, hydrography, research and design, electrical development and pumping, all phases of operation and maintenance work, and colonization and settlement. In no other profession does experience count for so much and theory for so little as in engineering. Few of the engineers of the Indian irrigation service have had a wide experience and as a

result of the type of organization, none have had really extensive experience in any one line of engineering, so as to qualify or rate as experts or specialists.

The opportunity for cooperation so as to make available for the Indian irrigation work the highly trained specialists of the larger organization is obvious. In 1907 at the request of the Secretary of the Interior a plan contemplating a close cooperation between these two bureaus was formulated. In some instances the conduct of the work on Indian reservations was transferred to the Bureau of Reclamation. As stated at the time the plan was formulated: "Under this agreement, the Indian Bureau makes selection of the projects to be undertaken, formulates the general policy to be followed, and also determines the rate of progress," which necessarily depends upon congressional appropriations.

This early plan for cooperation between the two bureaus apparently was not an entire success, principally for the reason that some of the projects selected by the Indian Bureau were not feasible and Indian Bureau officials soon evinced a tendency to create an alibi by claiming that they were not in any way responsible either for the selection of the projects or conduct of the work. Under this agreement work was done by the Reclamation Service on the Flathead, Fort Peck, and Blackfeet projects of Montana, and also on the Pima Reservation of Arizona, and the Yuma Reservation of California. The three Montana projects under the agreement were entirely transferred to the Reclamation Service, but were turned back to the Indian Bureau in March of 1924. The detailed history of the operations under this early cooperative agreement is contained in the body of this report, particularly in the report on the Fort Peck project.

Plan for cooperation.—Despite the failure of this early plan looking to cooperation between these two bureaus, the advisors are of the opinion that such cooperation is not only entirely feasible, but that it is very desirable from every consideration. While it is true that the Indian projects in general are smaller and less complicated than those of the Bureau of Reclamation, yet new problems are continually arising. The magnitude of the Indian irrigation work is not sufficient to justify the employment of a number of specialists in each of the various lines of irrigation work such as the Bureau of Reclamation maintains. When an appropriation is received by the Indian Bureau for preliminary surveys and investigations of a proposed project, for the construction of a project, or for any other activity in connection with irrigation development, it is necessary, as the regular engineering organization is inadequate, to depend largely upon temporary employees. The employment being temporary and the salaries paid by the Indian Bureau being always lower than those paid by any other Government bureau or private organization, the natural result is that much time and money are lost through inefficiency and incompetency, and not infrequently errors are made in the work that ultimately result in the loss of many thousands of dollars. Instances of this kind are apparent on many of the Indian irrigation projects. What is here stated with reference to engineering and construction applies with equal force to the legal phase of the work. Everywhere are evidences that this important phase of the work has been neglected because of a misconception on the part of the Indian Bureau of its importance, with the result that the legal force is entirely inadequate to carry on the work. It is to prevent repetitions of such costly errors that we urge the adoption of either a plan for the close cooperation and coordination of the irrigation activities of the Indian Bureau with those of the Bureau of Reclamation or the transfer of those projects wherein the Indian interests are small as compared with the white interests.

Transfer of projects to Bureau of Reclamation.—Another plan, whereby the irrigation projects of the Indian Bureau would be transferred to the care of the Bureau of Reclamation suggests itself, and in fact has at various times been considered. Several projects, in fact, all the larger and more prosperous of the Indian irrigation projects are, as a matter of fact, not Indian, but white projects. On such projects as the Yakima, Flathead, Crow, Wind River, Uintah, and Fort Hall, most of the farming is being done by whites, and the acreage owned, controlled, and farmed by whites will continually increase. On the Yakima project, less than one-tenth of the land now utilized is farmed by Indians; on the Wind River, less than one-half; on the Uintah Reservation less than one-fourth; on the Fort Hall less than one-fourth; on the Flathead project only about one-eighth; and on the Crow project, only about one-sixteenth, or 6 per cent of the land irrigated is used by Idnians.

There is really no good reason that we can see as to why such projects should be under the management of the Indian Bureau. It might be argued by some that the Indian Bureau would be more likely to protect the rights of the Indians. Such argument, however, has little merit. The large and well organized legal staff

of the Bureau of Reclamation would be far better able to protect the water rights and all other related rights of the Indians, than the one attorney who constitutes the legal staff of the irrigation division of the Bureau of Indian Affairs, be he ever so well qualified and efficient.

It is inconceivable, for instance, had the legal work of the Indian irrigation projects been in charge of the legal staff of the Bureau of Reclamation, that land carrying with it water rights and irrigation systems, would have been sold without some provision for collecting the Government's investment, or that many other mistakes or oversights involving or that may involve the loss of large sums of money, either by the Government or by the Indians, would have occurred.

The large and well trained engineering staff of the Bureau of Reclamation would be far better able to cope with the problems of all the above projects than is the small engineering organization of the Indian Bureau. The principal weakness of the irrigation division of the Indian Bureau is that too much responsibility is placed upon one man, and there is not the review and consultation necessary to eliminate mistakes. One man may, and frequently does suggest or propose a certain project, or extension of project, make the preliminary surveys and investigations, if any are made, send in a glowing report of the possibilities and a low estimate of the cost, and recommend an appropriation for construction; the appropriation may be made and the project or extension built. The final result may be that the Government has made an investment of a considerable sum of money in an irrigation system. It may not be feasible. The land may be unproductive, or the water supply deficient. If so, the Government is the loser. All this unless it is a project of considerable size, may have been done on the recommendation of one engineer, whose investigations, data, assumptions, conclusions, and estimates may never have been scrutinized or checked by a board of consulting engineers. Instances of this kind are not rate in the Indian irrigation service, and the result is that we have several projects covering larger areas of land than can be served by the available water supply.

It is believed that the transfer to the Bureau of Reclamation of these so-called Indian projects, wherein the land is principally owned and farmed by white people, would put an end to the subterfuge now frequently practiced of securing appropriations and benefits for the water users undre the guise that they are for the benefit of the Indians, when as a matter of fact white people are the principal beneficiaries and often secure benefits without being required to pay for them or enter into contracts whereby the Government is properly protected in its investment. Another advantage would be that in some instances neighboring or adjacent Bureau of Reclamation projects and Indian projects would be combined and operated under one management. As an instance, on the Wind River or Shoshone Reservation, we have on one side of the Wind River the Indian irrigation project, and on the other side of the river the Riverton project of the Bureau of Reclamation. By operating these two projects under one management there would be a considerable saving effected with increased efficiency.

RECOMMENDATIONS

In view of the foregoing, it is recommended—

1. That the irrigation work on the Yakima, Flathead, Wind River, Fort Hall, Crow, Uintah, and Gila River Reservations be transferred to the Bureau of Reclamation.

2. That the work on all other Indian reservations be continued by the Indian irrigation service.

3. That the Indian irrigation service be completely reorganized by (a) definitely fixing in one person who should be an engineer under the Commissioner of Indian Affairs the responsibility for the direction of and the proper conduct of the work, so as to eliminate the confusion incident to a double-headed organization as at present; (b) establishing the office of the chief engineer at some western point, preferably Denver, so that he may be in close touch with the work; (c) providing the chief engineer with an adequate number of assistants, both engineering, legal, and clerical, to properly attend to the work; (d) abolishing the offices of the supervising engineers; (e) having the designing for all Indian projects done by the designing division of the Bureau of Reclamation; (f) having all legal work in connection with all Indian projects done by the legal section of the Bureau of Reclamation; (g) having all preliminary investigations for the determination of the feasibility of proposed peojects done by the Bureau of Reclamation; (h) making the salaries of all employees in the Indian irrigation service commensurate with those paid for similar duties in the Bureau of Reclamation or other branches of the Government service.

If the first of the foregoing recommendations is not adopted, or necessary legislation for placing it in operation is not encated, it is recommended that all Indian irrigation work be continued by the Indian irrigation service reorganized as proposed in recommendation No. 3, in which case it is further recommended—

4. That the accounts and water users' ledgers be kept in the project offices for the seven projects named in recommendation No. 1 and that collections be made by the project management, the chief clerk being a disbursing agent.

5. That in any event, whether or not recommendation No. 1 is adopted, all accounting and disbursing for the irrigation projects not named in recommendation No. 1 be done by the chief clerk and disbursing agent of the Indian reservation agency.

INDIAN IRRIGATION ACTIVITIES—HISTORY AND GENERAL LEGISLATION

Necessity for land reclamation by irrigation.—Many of the Indian reservations are in the arid regions of the West where without irrigation land is unproductive and unsuited to sustain human life. As the wild animal life on which the Indian in his primitive condition depended for food was exterminated or driven out before the advancing tide of immigration and settlement the duty of caring for and feeding the Indians, as well as protecting the settlers, devolved upon the Government. It naturally followed that principally as a war measure, to protect settlers and pioneers and not so much from humanitarian or sentimental considerations, the reservation with its necessary concomitant, the ration system, was adopted. To purchase their good behavior, the Indians were fed and clothed by the Government. Although the care and feeding of many thousand Indians entailed a tremendous expense on the public Treasury it was far less expensive than the only other alternative, innumerable Indian uprising and continual warfare. It is said that for a period of several years prior to the adoption of President Grant's peace plan, when the policy of extermination was in vogue, it was costing the Army at the rate of $1,000,000 each to kill the Indians.

When first instituted it was the thought of those having the matter in charge that it would be necessary to feed the Indians only for a very few years until they should be able to adjust themselves to the new conditions and become able to support themselves in the ways of white men. It was soon found, however, that the civilizing and industrializing process is a slow one and that it would require much longer to bring about the desired results than was at first supposed. Two factors in particular interfered with the success of the plan: (1) The Indian naturally showd little inclination to work as long as the Government fed him, and if the rations were reduced for the purpose of causing him to put forth some effort in his own behalf, he either suffered from hunger or went on the warpath. (2) Even if the Indian showed some inclination to work, there was little or nothing in the way of gainful employment that he could do or was fitted to do.

The natural thing to do since the Indian had the land was to try to interest him in supporting himself from agriculture. Hence, to enable the Indians to engage in agricultural pursuits and thus support themselves on those reservations within the arid region, the Bureau of Indian Affairs, having learned of the art of irrigation and its benefits from a few of the Indian tribes of the arid Southwest where irrigation had long been practiced, undertook to carry its benefits to other reservations where it was deemed advisable and thus embarked on a program of irrigation development.

The Government's first attempt in arid land reclamation.—The first irrigation work undertaken by the Government was that on the Colorado River Indian Reservation in Arizona. This is not far from the Gila and Salt River Valleys of Arizona, where irrigation was then being practiced by the Pima and other Indians and had been practiced by their probable ancestors from prehistoric times. The Mojave and other Indians of the lower Colorado River Valley apparently had learned something of the art and of the benefits of irrigation from these ancient irrigators on the Gila and Salt Rivers, and had themselves thus originated, and when first found by white men, were practicing a rude form of irrigation adapted to the natural conditions under which they lived and similar to the practice of the early Egyptians. As the usual annual overflow of the Colorado River receded these Indians planted their crops on plots of ground that had recently been inundated. In this way they were able to grow maize or corn, melons, beans, and pumpkins. Occasionally, however, the usual early summer flood of the Colorado River does not occur, and in consequence these Indians with their primitive method of agriculture could produce no food, so that seasons of drought were followed by suffering and starvation. It was to

prevent these occasional famines among the Indians of the lower Colorado that the first irrigation system to be constructed by the Government was begun. As stated by Col. Charles D. Poston, Superintendent of Indian Affairs for Arizona Territory, and later Arizona Territorial Delegate to Congress, it was also "planned to collect and bring together on this reservation all the Indians of the lower Colorado River and its tributaries and enable them to become self-supporting by constructing for them an irrigating canal."

The Government's first venture in the reclamation of arid land by irrigation was provided for by an appropriation carried in the act of Congress of March 2, 1867 (14 Stat. 514), "for the expense of collecting and locating the Colorado River Indians in Arizona on a reservation set apart for them by section 1, act of March 3, 1865, including the expense of constructing a canal for irrigating said reservation, $50,000." Supplementary to the foregoing appropriations were those carried by the act of July 27, 1868 (15 Stat. 222), and the act of May 29, 1872 (17 Stat. 188), providing $50,000 and $20,000, respectively, for completing the construction of an irrigating canal on the Colorado River Reservation, Ariz. This canal was finally completed after a manner, but after several unsuccessful attempts to operate and maintain it it was abandoned in 1876.

General legislation and appropriations for irrigation.—No further appropriations were made for irrigation work for the benefit of the Indians until for the fiscal year 1885, when by act of Congress of July 4, 1884 (23 Stat. L. 94), a general appropriation of $50,000 was made, not for any particular reservation but to be used on various reservations in the discretion of the Secretary of the Interior "for the purpose of constructing irrigating ditches on Indian reservations and instructing Indians in farming in connection therewith." The next appropriation for similar work was one of $30,000 for the fiscal year 1892 for irrigation work on Indian reservations in Arizona, Montana, and Nevada. Following this, or beginning with the fiscal year 1893, Congress made annually a general appropriation under the designation "Irrigation, Indian reservations," for use on such reservations, or for such purposes as were not provided for by specific appropriations. For the fiscal year 1893, $40,000 was appropriated; an appropriation of $40,000 was made for the fiscal year 1894. For each of the fiscal years 1895 and 1896, $30,000 was appropriated.

In the appropriation act for the fiscal year 1897 (act of June 10, 1896, 29 Stat. L. 341), appropriating $30,000, provision was first made for the employment of engineers in the proviso inserted at the suggestion of the Indian Bureau: "Of this amount not exceeding $2,700 may be used for the temporary employment of persons of practical experience in irrigation work at a compensation not to exceed $75 per month each." Apparently engineers with the missionary spirit were desired. It is interesting to note that up to this time $230,000 had been appropriated and presumably all expended under this general item Irrigation, Indian reservations. In addition to this certain specific appropriations had been made for irrigation work on certain other reservations.

For the fiscal year 1898, $30,000 was appropriated "for the construction, purchase, and use of irrigating machinery and appliances on Indian reservations in the discretion of the Secretary," provided that the persons employed in irrigation work may have "compensation not to exceed $100 per month each." (Act of June 7, 1897, 30 Stat. 85.)

For the fiscal year 1899 the act of July 1, 1898 (30 Stat. L. 591), provided $40,000 for reservoirs and the purchase of water rights on Indian reservations in addition to the purposes enumerated in the previous act.

For the fiscal year 1900, $40,000 was provided for the same purpose as provided in the previous appropriation act.

The act of March 31, 1900 (31 Stat. L., 239) provided for the fiscal year 1901 $50,000 for the same purpose as specified in the previous appropriation act and provided that "the Secretary of the Interior may employ superintendents of irrigation who shall be skilled irrigation engineers, not to exceed two, as in his judgment may be necessary to secure the construction of ditches and other irrigation works in a substantial and workmanlike manner * * * at a salary of $1,000 per annum."

For the fiscal year 1902 the general appropriation for Irrigation, Indian Reservations, was $100,000, and provided "for pay of eight Indian inspectors, one of whom shall be an engineer, competent in the location, construction, and maintenance of irrigation works at $2,500 per annum each."

For the fiscal years 1903 and 1904 $150,000 each was appropriated.

For the fiscal year 1905 the act of April 21, 1904 (33 Stat. L. 206), appropriated $185,000.

For the fiscal year 1906, by act of March 5, 1905 (33 Stat. L. 1049), there was appropriated for Irrigation, Indian Reservations, a total of $206,000, and provision was made "for pay of 8 Indian inspectors, 2 of whom shall be engineers, 1 to be designated as chief, competent in the location, construction, and maintenance of irrigation works at $2,500 per annum each, except the chief engineer who shall receive $3,500.

For the fiscal year 1907 $155,000 was appropriated for Irrigation, Indian Reservations.

For the fiscal year 1908 the act of March 1, 1907 (34 Stat. L. 1017), appropriated $125,000 and provided "not to exceed five skilled engineers may be employed."

For the fiscal year 1909 the act of April 30, 1908 (35 Stat. L. 71), provided $200,000 "for construction of ditches and reservoirs, purchase and use of irrigating tools and appliances and water rights, including lands necessary for canals and reservoirs for Indian Reservations in the discretion of the Commissioner of Indian Affairs under the direction of the Secretary of the Interior and subject to his control."

The act of March 3, 1909 (35 Stat. 782), appropriated for the fiscal year 1910 $200,000 for Irrigation, Indian Reservations.

For the fiscal year 1911 the act of April 4, 1910 (36 Stat. L. 270), appropriated "for construction, repair, and maintenance of ditches, reservoirs, and dams, purchase of irrigation tools, water rights, lands necessary for canals and reservoirs for Indian reservations and allotments, and for drainage and protection of irrigable lands damaged by floods, $249,100" to remain available until expended; and provided, "hereafter no new irrigation project on any Indian reservation, allotments, or lands shall be undertaken until it shall have been estimated for and a maximum limit of cost ascertained from the surveys, plans, and reports submitted by the chief irrigation engineer of the Indian Service, and approved by the Secretary of the Interior, and such limit of cost shall in no case be exceeded without express authorization of Congress, and hereafter no new project to cost in the aggregate to exceed $35,000 shall be undertaken on any Indian reservation without specific authority of Congress." This act directs that the Secretary of the Interior shall transmit to Congress on the first Monday in December, 1910, and annually thereafter, a statement showing the original estimated cost, present estimated cost, and total amount of all moneys expended thereon for construction, extension, repair, or maintenance of each irrigation project on Indian reservations. Provision is also made for carrying out existing agreements with the Reclamation Service for pay of 1 chief inspector of irrigation who shall be a skilled irrigation engineer, $4,000; 1 assistant inspector of irrigation at $2,500; and also provides that there may be employed "superintendents of irrigation who shall be skilled irrigation engineers not to exceed 7 in number."

For the fiscal year 1912 the act of March 3, 1911 (36 Stat. L. 1059), appropriated $314,300 for the same purposes as specified in the previous acts.

For the fiscal year 1913, the Act of August 24, 1912 (37 Stat. L. 518) appropriated $325,000 and for the fiscal year 1914, the Act of June 30, 1913 (Public No. 4, p. 1) appropriated $338,000 for "Irrigation, Indian Reservations."

Reimbursement of construction cost, act of August 1, 1914.—Up to and including the fiscal year 1914, the cost of all irrigation work undertaken on Indian reservations under the general appropriations "Irrigation, Indian Reservations," made since 1884, had been borne by the United States, and most of the work done under special or specific appropriations, had been charged against Indian tribal funds or made reimbursable out of tribal funds, although a few of the special appropriations had been made from the United States Treasury. Previous to 1914 the cost of these Indian irrigation projects that had been made reimbursable, was charged against the Indian tribe as a whole, or rather against the Indian tribal fund and not against the particular land that was benefited by the irrigation works. This was manifestly unfair, as in most, if not in all cases, the irrigation projects included only a part of the reservation, so that the land of many of the Indians was not included in the project. In accordance with the legislation previous to that of August 1, 1914, however, all members of the tribe were required to pay an equal part of the cost of the irrigation system, regardless of whether or not they received any benefits from irrigation. In the appropriation act for the fiscal year 1915, however, that is, the act of August 1, 1914 (38 Stat. L. 583), Congress announced a distinct and sweeping change in legislative policy, both in respect to these general appropriations and to the appropriations for specific pro-

jects. This was done by two provisos appended to the general irrigation appropriation act. They read as follows:

"*Provided further*, That all moneys expended *heretofore or hereafter* under this provision shall be reimbursable where the Indians have adequate funds to repay the Government, such reimbursements to be made under such rules and regulations as the Secretary of the Interior may prescribe: *Provided further*, That the Secretary of the Interior is hereby authorized and directed to apportion the cost of any irrigation project constructed for Indians and made reimbursable out of tribal funds of said Indians in accordance with the benefits received by each individual Indian so far as practicable from said irrigation project, said cost to be apportioned against such individual Indians under such rules, regulations, and conditions as the Secretary of the Interior may prescribe."

Thus it was announced that the general appropriations theretofore made, together with such specific appropriations as had been made from the United States Treasury, and up to that time apparently a gratuity, as well as those thereafter to be made, should be reimbursable to the Treasury from Indian funds, whenever such Indian funds were adequate, and further, that the whole cost of any project theretofore financed by appropriations from the Treasury and made reimbursable from Indian tribal funds was to be apportioned to those individuals of the tribes whose lands were actually benefited, thus making the irrigation charge an individual or personal obligation, instead of a tribal obligation as it had been theretofore.

As a result of this legislation, debits aggregating $3,000.000 were set up against various Indian tribes for irrigation works constructed between 1884 and 1914. (See Appendix B, Gratuities Converted into Reimbursables by the act of August 1, 1914. Hearings, House of Representatives, Committee on Indian Affairs, act of June 30, 1919.)

The reimbursement provision of the act of August 1, 1914, particularly the retroactive feature of it, whereby appropriations previously made apparently as gifts or gratuities, were converted into reimbursables, has been the subject of much discussion, and of much bitter criticism on the part of the Indians affected, various Indian welfare associations, and some officials and employees of the Indian Bureau. The constitutionality of the law, however, has never been judicially passed upon. It is argued by many that, by reason of the retroactive feature, it is unconstitutional. It is confidently asserted by others apparently equally well qualified to judge, that by reason of the broad general powers of Congress to legislate for our Indian wards, by virtue of which Indian treaties and agreements may be abrogated, the law is not in conflict with the Constitution.

The law of August 1, 1914, was apparently based on a "draft of proposed legislation" which was transmitted to the United States Senate Committee on Indian Affairs by Hon. F. H. Abbott, secretary of the Board of Indian Commissioners under date of February 9, 1914. The law as eventually passed, however, differs in some substantial particulars from the legislation proposed by Mr. Abbott and which apparently had the approval of the Bureau of Indian Affairs. The more important provisions contained in the draft of proposed legislation are:

1. That the proportionate cost of all projects, both construction and maintenance, heretofore commenced or completed or hereafter to be constructed for the irrigation of Indian lands, whether paid for out of gratuity appropriations or from direct or reimbursable appropriations from tribal funds, shall be apportioned equitably and the cost thus determined, which cost in no case shall exceed a reasonable valuation of the irrigation benefits at the time said determination of costs is made, shall become a charge against the land.

2. This charge shall become a first lien on the land; in the case of trust patents already issued notation of such lien shall be given in such manner as the Secretary of the Interior may prescribe, and in the case of trust patents or patents in fee hereafter issued, the fact of such lien shall be recited on the face of said patents and the amount of the lien set forth, which said lien, however, shall not be enforced so long as the original allottee or his heirs or other persons of Indian blood shall actually occupy the allotment.

3. In the case of projects heretofore or hereafter constructed in whole or in part from tribal funds the Secretary of the Interior is authorized to reimburse said tribal funds the amount of the irrigation costs thus charged from the pro rata share in the tribal funds expended on such project when distributed, to which the owners of the land benefited are entitled, for the payment of such owners' respective portions of said costs.

4. The Secretary of the Interior, on or before July 1, 1914, shall establish a uniform system of cost keeping in connection with the maintenance of all projects for the irrigation of Indian lands, and after that date all charges of operation and maintenance shall be apportioned equitably among the lands, whether beneficial use of the same is made or not, said costs to be paid in accordance with rules and regulations to be prescribed by the Secretary, and unless paid to become a charge and lien against said land.

5. No new irrigation projects to be paid for from Indian funds shall be authorized by Congress until the purpose and scope of said project and the estimated cost thereof shall have been explained to the Indians whose funds it is proposed to use for such purposes, and they shall have been given opportunity to express in writing their views thereon.

It will be noted that the legislation as proposed by the Board of Indian Commissioners, and apparently approved by the Bureau of Indian Affairs, contained a provision making the irrigation charges a lien against the land benefited. This provision, however, for some reason was not included in the law as finally passed by Congress, and this omission, or the failure to make the irrigation charges a lien against the land, is the principal defect of the law of August 1, 1914, as finally passed and approved. Instead of making the irrigation charges a lien on the land, as proposed by the Board of Indian Commissioners, in the law as passed the irrigation charges were made a personal obligation. The principal reasons advanced as a justification for the legislation proposed by the Board of Indian Commissioners and which finally resulted in the law of August 1, 1914, as given in Mr. Abbott's letter transmitting the draft of the proposed legislation to the United States Senate Committee on Indian Affairs, are the following:

1. Its main and central purpose is to stop the gratuitous use of tribal and Government funds in the construction and maintenance of irrigation projects to charge the costs thereof against the land benefited or against the pro rata shares in the tribal funds when distributed of the individual Indians whose lands are benefited, and to give the Indians a voice in the expenditure of their own funds for irrigation purposes and make them share the responsibility of maintaining and operating the completed projects. If this amendment is enacted into law, nearly $400,000 carried each year in the Indian appropriation acts as gratuity items will become reimbursable.

2. This increase is due in large part, to the carrying out of laws enacted by Congress for the breaking up of the vast tribal estates of the Indians and to the establishment of the policy of individualization in connection therewith. Before the volume of the business of the Indian Bureau will begin to grow less, it will become very much greater; and the value of Indian property over which the Indian Bureau is required by law to exercise supervision, now estimated at nearly $1,000,000,000, will undoubtedly be very much greater before it begins to grow less.

3. How is the Government going to meet this growing problem? Will Congress increase appropriations to meet the increased demands imposed by law changing economic conditions upon the Indian Bureau? Is there any other way out?

4. The proposed legislation relating to Indian irrigation, which is suggested, is believed a partial answer.

5. Indian property must begin to protect and preserve itself; it must be made to bear its own administrative burdens.

6. The Indians must have a greater measure of representation in the handling of their property; they must carry constantly increasing burdens of individual responsibility, and thereby learn to carry larger and larger burdens.

7. If the property of the Indians can be made automatically self-sustaining, then the energies of the Government and its gratuity appropriations can be concentrated in their education and the improvement of their health.

Commenting further and somewhat more in detail on the advisability and necessity for the proposed legislation, Mr. Abbott continues:

About 600,000 acres of irrigable Indian lands have been brought under ditch. Of this area less than 100,000 acres are being irrigated by Indians, while a large part of the area thus irrigated is not farmed, but is used to produce hay crops. And, notwithstanding the fact that either tribal or Government funds have been used to irrigate these lands, on all except three reservations, when patents in fee are issued to Indian allottees, and in every case where their lands are sold under the supervision of the Government either the individual Indian who sells the land or the purchaser thereof puts in his pocket the value of the water right for

which the tribe or the Government has paid; and not only are the members of the tribe not consulted with respect to the expenditure of their money which ultimately passes in this manner either to the individual allottee or to the white purchaser of his land, but the individual whose land is benefited is given no opportunity to assume any responsibility in connection therewith or to appreciate the value of the benefit conferred, while the free-water right thus secured by the individual Indian offers a constant inducement to him to part with his land.

The remedies needed will be suggested briefly, as follows:

1. General legislation that will charge the individual land benefited with the cost of construction and maintenance, payment to be made out of the share in the tribal funds of the individual whose land is benefited or from the proceeds of the sale of the land when it passes from Indian ownership where the share of the individual in the tribal fund is insufficient.

2. The general legislation suggested should provide that the tribe whose funds it is proposed to use for the construction of irrigation projects shall be first consulted.

3. The proposed general legislation should also provide for charging of costs of maintenance and operation against the lands under the project and should give the Indians whose lands are benefited a voice in said maintenance and operation.

4. In order not to overburden irrigated Indian lands by the legislation suggested especially since the Indians have not heretofore been consulted, the costs of supervisory engineering and of experimental construction and cost of investigations and preliminary surveys should be excluded from the charges made against the lands and paid from gratuity appropriations.

5. Reimbursable appropriations from tribal funds should be made immediately for all Indian reservations where the utilization of irrigable lands has not kept pace with the construction of irrigation projects, through lack of funds in the hands of individual Indians to make such utilization possible.

6. Skilled irrigation farmers should be provided out of gratuity appropriations to give advice and assistance to Indians having irrigable lands. The enactment of the legislation suggested would make reimbursable, when the lands in question pass from Indian ownership, all items included in the estimate of $345,700 "for irrigation, Indian reservations, 1915," in the pending Indian bill, except those to pay the salaries and expenses of supervisory engineers, the costs of experimental construction and of preliminary surveys, amounting to approximately $200,000.

In addition to this ultimate saving of approximately $400,000 to the Government in the pending Indian bill, the effect of the proposed legislation would be to make reimbursable to the Government similar sums heretofore appropriated, sums which would aggregate, perhaps, $1,000,000 when the lands in question pass from Indian ownership, and make reimbursable to Indian tribes sums heretofore expended from tribal funds in excess of the pro rata shares of the individual whose land has been benefited in said funds.

There are several Indian irrigation projects now being constructed and maintained out of gratuity appropriations which should be paid for from tribal funds. For instance, there is no reason why the cost of irrigation and water development for the Navajo Indians should be paid for out of gratuity appropriations. The aggregate individual and tribal property of these Indians is estimated at $28,022,270, nearly $1,000 per capita. This estimate does not include their immense coal properties, estimated by the Geological Survey at 16,700,000,000 tons; they have also $7,500 worth of timber. The gratuity items in the pending Indian bill for survey and maintenance of ditches on the Klamath Indian Reservation in Oregon should likewise be changed to reimbursable items. The aggregate individual and tribal resources of the Indians on this reservation are estimated at $28,846,935.39, or $25,824 per capita.

The right of the Indians to a voice in the expenditure of their funds in the irrigation of their lands is a fundamental one and should not longer be ignored. On the other hand, there is no obligation on the part of this Government to pay out gratuitously $1 for the irrigation of the land of an individual Indian who has ample means of his own for this purpose. Not only that, but every dollar so invested, by depriving the individual Indian benefited of the responsibility connected with the acquisition of the benefit and of the opportunity of appreciating the money value thereof, is a lesson in demoralizing paternalism and an investment in pauperism. To use the funds of an Indian tribe without its consent to confer benefits upon the individual members thereof, and through such individuals often to drain the tribal resources into the pockets of white men is still less defensible.

It is noticeable that the proviso to the act of 1914 merely directs an apportionment. It does not purport to create a lien, nor does it give any directions as to how or when the apportioned costs shall be collected, or, indeed, that they shall be collected at all. It has been suggested that this apportionment was for mere purposes of information with a view to further legislation, and that in fact imposes no liability whatever on individual Indians.

It is not believed, however, that this is the true meaning of the act of 1914. If information only was wanted, there would apparently have been no need for a formal apportionment "under such rules, regulations, and conditions as the Secretary may prescribe." An arithmetical calculation based upon the cost of the project and the number of irrigable acres in each allotment would seemingly have answered every requirement for more information.

In reporting the appropriation bill of 1914 to the Senate, the Committee on Indian Affairs of that body said:

"There is a further provision directing the Secretary of the Interior to apportion the cost of any irrigation project constructed for Indians and made reimbursable out of tribal funds of said Indians, in accordance with the benefits received by each individual so far as practicable from said irrigation project, said cost to be apportioned against each individual Indian under such rules, regulations, and conditions as the Secretary of the Interior may prescribe.

This legislative authority is necessary in order to meet certain conditions now existing on the reservations where the Government has expended large amounts of tribal funds and where only a part of the Indians of the reservation receive any benefit whatever from the use of their funds. As an example, on the Flathead Reservation the Government is constructing irrigation projects for the Indians and for the white people out of the Indian tribal funds, and only a minority of the Indians on that reservation will have their lands irrigated. We believe it is only just and fair that those Indians who got their lands irrigated should pay the cost of the irrigation work. This plan is being developed by the department.' (Senate Reports, 63d Cong., 2d sess., vol. 2, Misc. Rep. No. 519, p. 7.)

In an interpretation of the reimbursable feature of the law of August 1, 1914, the Attorney General in his opinion of September 2, 1921, having under consideration the question as to the obligation of purchasers of Indian lands on the Wind River Reservation to pay irrigation charges, states:

"In an effort to ascertain the situation confronting Congress when these acts were passed, a large number of Indian treaties and irrigation statutes have been examined. They comprise a mass of special legislation to which it would seem impracticable to apply, uniformly, the rule of individual liability for construction costs without infringing the provisions of a number of treaties and ratified agreements. However, that may be, a review of this legislation shows that tribal funds were being exhausted or depleted from year to year to the manifest injury of those Indians whose allotments could not be irrigated from the systems under construction. Moreover, in a number of instances, Indian tribal funds were being used, either directly or by way of reimbursing Treasury appropriations to finance projects covering not only Indian lands but also large areas of ceded lands which had passed, or were rapidly passing into the hands of white men.

"I am pursuaded, therefore, that the proviso in question is to be construed as substantive and effective legislation imposing an individual liability upon Indians having irrigable allotments; * * *."

Law of February 14, 1920.—For several years following the act of 1914 no steps were taken and no regulations formulated by the Interior Department looking to an apportionment of irrigation costs as therein directed, the reason given being that the costs could not be known until the irrigation system sewer completed, and practically none was then completed. In this situation Congress in the Indian appropriation act of February 14, 1920 (41 Stat. 409), enacted the following:

"The Secretary is hereby authorized and directed to require the owners of irrigable land under any irrigation system heretofore or hereafter constructed for the benefit of Indians and to which water for irrigation purposes can be delivered to begin partial reimbursement of the construction charges, where reimbursement is required by law, at such times and in such amounts as he may deem best; all payments hereunder to be credited on a per acre basis in favor of the land in behalf of which such payments shall have been made and to be deducted from the total per acre charge assessable against said land."

Under the law of February 14, 1920, the rate of assessments to be made was left to the discretion of the Secretary of the Interior except on the Fort Hall and Wapato projects, where the rates had already been fixed. On three of the

projects—Flathead, Blackfeet, and Fort Peck—the rates of assessment were fixed at 50 cents per acre annually. On the remaining projects assessments were fixed at the rate of 5 per cent of the per acre construction cost as of June 30, 1920, and made due November 15, 1920, and each year thereafter until 1927, when the rate on these projects was reduced to 2½ per cent per annum.

For many years the department to a considerable extent has been handicapped in making irrigation collections as a result of the fact that there was no general law specifically making irrigation charges a lien against the land. As a result of the absence of special legislation concerning this subject, in the case of some of the projects, no such lien existed. By specific legislation or legislation particularly applying to certain projects such liens had been created on the Blackfeet, Fort Peck, Flathead, Crow, Wapato, Fort Hall (partial), Fort Belknap, and Gila River or Florence Casa Grande projects.

Law of 1928.—To correct this situation Congress in the act of March 7, 1928, inserted the following provision:

"* * * *Provided further*, That the costs of irrigation projects and of operating and maintaining such projects where reimbursement thereof is required by laws shall be apportioned on a per acre basis against the lands under the respective projects and shall be collected by the Secretary of the Interior as required by such law, and any unpaid charges outstanding against such lands shall constitute a first lien thereon which shall be recited in any patent or instrument issued for such lands."

Recommendations.—It is recommended that all legislative enactments pertaining to Indian irrigation in general, as well as those relating to specific projects should be compiled, arranged, indexed, and abstracted or digested for easy references; and that this compilation should be printed and kept up to date for the benefit of the officials as well as for others interested.

WATER RIGHTS AND WATER SUPPLY

It is the opinion of the advisers that presumably as the result of the insistent demand for economy and still more economy that has characterized Government operations for several years past, or more properly to what we consider a mistaken idea of economy, the all important subject of a water supply for many of the Indian irrigation projects is being neglected. As a matter of fact, the records show that since the date of the Winters decision, by which was promulgated the principle that by the establishment of an Indian reservatln in the arid country the Government by implication appropriated and reserved for the use of the Indians a right in any water available to the extent necessary to irrigate all the irrigable land within the reservation. there has been a tendency on the part of the Indian Bureau to rely alone on this decision, and in consequence to make little or no effort to initiate and to protect the water rights for Indians in accordance with the generally established laws and customs that are recognized throughout the arid country. This attitude of the Indian Bureau is the cause of much bitter feeling and criticism against the Government in many sections of the West.

It is our judgment that many of the Indian irrigation projects have already been extended over large areas than the water supply available will serve. It is our conclusion that in some cases these extensions have been made either without the knowledge of the Indian Office or at least without a realization of the magnitude of the extensions and their significance. Some of these extensions have doubtless been made with the best intentions, but with an exaggerated idea of the water supply available. Others, however, are so far out of reason that one is forced to the conclusion that the only purpose in making the extensions was as a pretext for reporting a larger acreage under constructed works and thus be in a position to secure larger congressional appropriations for operation and maintenance.

As yet, since only a small part of the so-called irrigable land under constructed works is being utilized, there is not much complaint as to the insufficiency of the water supply. When, however, an attempt is made to irrigate all the land under canals instead of one-fourth or one-half of it as now, there will be a different story. Then the Government will be confronted with claims by both Indians and whites who have purchased Indian lands, demanding damages for failure to deliver water to land for which there is no water available.

On several of the projects complaints were made by both Indians and whites concerning their apprehension as to the adequacy of the water supply, even though most of the land is not yet being irrigated.

In reports on file in the Indian Office relating to both the Crow and the Wind River Reservations it is admitted that there has not always been an adequate water supply for the acreage now in cultivation, that storage will or may be necessary when all the land is utilized, but doubt is expressed as to whether there are any feasible storage sites. It seems to the advisers that this is a matter that should have received consideration before the canals were extended over the areas they now cover.

The Winters decision.—The Supreme Court in its decision in the case of Winters *v.* the United States, on Janaury 6, 1908, held that there was an implied reservation in the agreement of May 1, 1888, with the Indians establishing the Fort Belknap Reservation, of a sufficient amount of water from Milk River for irrigation purposes, and that the water of that river can not be diverted so as to prejudice this right of the Indians by settlers on the public domain or those claiming riparian rights on that river.

It is impossible to reconcile with the actual facts some of the statements made in the allegations contained in the bill of complaint in this case. They apparently are the result of lack of knowledge, which seems improbable, or simply another instance, all too prevalent among some officials of the Bureau of Indian Affairs, of the tendency to indulge in broader statements than the facts justify whenever the Indian and his progress are concerned. As an instance, it is stated:

"Afterwards, but long prior to the acts of the defendants complained of, to wit, on the 5th of July, 1898, the Indians residing on the reservation diverted from the river for the purpose of irrigation a flow of 10,000 miner's inches of water to and upon divers and extensive tracts of land, aggregating in amount about 30,000 acres, and raised upon said lands crops of grain, grass, and vegetables. And ever since 1899 and July 1898, the United States and the Indians have diverted and used the waters of the river in the manner and for the purposes mentioned, and the United States has been enabled by means thereof to train, encourage, and accustom large numbers of Indians residing upon the said reservation to habits of industry and to promote their civilization and improvement. It is alleged with detail that all of the waters of the river are necessary for all those purposes and the purposes for which the reservation was created, and that in furthering and advancing the civilization and improvement of the Indians, and to encourage habits of industry and thrift among them, it is essential and necessary that all of the waters of the river flow down the channel uninterruptedly and undiminished in quantity and undeteriorated in quality."

As a matter of fact it is now known and reported as the result of surveys that topographic conditions limit the area which is is possible to feasibly irrigate from Milk River within the reservation to less than 10,000 acres, not 30,000 acres, as alleged. It is difficult to find the crops of grain and vegetables being grown by Indians. The area used by Indians is almost wholly devoted to the growing of wild hay.

Quoting from the syllabus of this decision:

"In a conflict of implications the instruments must be construed according to the implication having the greater force; and, in the interpretation of agreements and treaties with Indians, ambiguities should be resolved from the standpoint of the Indians.

"In view of all the circumstances of the transaction this court holds that there was an implied reservation in the agreement of May 1, 1888, (25 Stat. 124), with the Gros Ventre and other Indians establishing the Fort Belknap Reservation, of a sufficient amount of water from the Milk River for irrigation purposes, which was not affected by the subsequent act of February 22, 1889, (25 Stat. 676), admitting Montana to the Union, and that the water of that river can not be diverted so as to prejudice this right of the Indians, by settlers on the public lands or those claiming riparian rights on that river.

"The Government of the United States has the power to reserve waters of a river flowing through a Territory and exempt them from appropriation under the laws of the State which that Territory afterwards becomes. (148 Fed. Rep. 684, affirmed.)"

Quoting from the opinion of the court:

"The motion to dismiss is denied and we proceed to the merits.

"The case as we view it turns on the agreement of May, 1888, resulting in the creation of Fort Belknap Reservation. In the construction of this agreement there are certain elements to be considered that are prominent and significant. The reservation was a part of a very much larger tract which the Indians had the right to occupy and use and which was adequate for the habits and wants of a nomadic and uncivilized people. It was the policy of the Government, it was the desire of the Indians, to change those habits and to become a pastoral and

civilized people. If they should become such the original tract was too extensive, but a smaller tract would be inadequate without a change of conditions. The lands were arid and, without irrigation, were practically valueless. And yet, it is contended, the means of irrigation were deliberately given up by the Indians and deliberately accepted by the Government. The lands ceded, were it is true, also arid; and some argument may be urged, and is urged, that with their cession there was the cession of the waters, without which they would be valueless, and 'civilized communities could not be established thereon.' And this, it is further contended, the Indians knew, and yet made no reservation of the waters. We realize that there is a conflict of implications, but that which makes for the retention of the waters is of greater force than that which makes for their cession. The Indians had command of the lands and the waters, command of all their beneficial use, whether kept for hunting, 'and grazing roving herds of stock,' or turned to agriculture and the arts of civilization. Did they give up all this? Did they reduce the area of their occupation and give up the waters which made it valuable or adequate? And, even regarding the allegation of the answer as true, that there are springs and streams on the reservation flowing about 2,900 inches of water, the inquiries are pertinent. If it were possible to believe affirmative answers, we might also believe that the Indians were awed by the power of the Government or deceived by its negotiators. Neither view is possible. The Government is asserting the rights of the Indians. But extremes need not be taken into account. By a rule of interpretation of agreements and treaties with the Indians, ambiguities occurring will be resolved from the standpoint of the Indians. And the rule should certainly be applied to determine between two inferences, one of which would support the purpose of the agreement and the other impair or defeat it. On account of their relations to the Government, it can not be supposed that the Indians were alert to exclude by formal words every inference which might militate against or defeat the declared purpose of themselves and the Government, even if it could be supposed that they had the intelligence to foresee the 'double sense' which might sometime be urged against them.

"Another contention of appellants is that if it be conceded that there was a reservation of the waters of Milk River by the agreement of 1888, yet the reservation was repealed by the admission of Montana into the Union, February 22, 1889 (ch. 180, 25 Stat. 676), 'upon an equal footing with the original States.' The language of counsel is that 'any reservation in the agreement with the Indians, expressed or implied, whereby the waters of Milk River were not to be subject of appropriation by the citizens and inhabitants of said State, was repealed by the act of admission.' But to establish the repeal counsel rely substantially upon the same argument that they advance against the intention of the agreement to reserve the waters. The power of the Government to reserve the waters and exempt them from appropriation under the State laws is not denied, and could not be. (United States *v.* The Rio Grande Ditch & Irrigation Co., 174 U. S. 690, 702; United States *v.* Winans, 198 U. S. 371.) That the Government did reserve them we have decided, and for a use which would be necessarily continued through years. This was done May 1, 1888, and it would be extreme to believe that within a year Congress destroyed the reservation and took from the Indians the consideration of their grant, leaving them a barren waste—took from them the means of continuing their old habits, yet did not leave them the power to change to new ones.

"Appellants' argument upon the incidental repeal of the agreement by the admission of Montana into the Union and the power over the waters of Milk River which the State thereby acquired to dispose of them under its laws, is elaborate and able, but our construction of the agreement and its effect make it unnecessary to answer the argument in detail. For the same reason we have not discussed the doctrine of riparian rights urged by the Government.

"Decree affirmed."

Following the Winters decision, the tendency of the courts up to the present time seemingly has been to be more and more liberal in protecting the Indians in their water rights. As an instance the Circuit Court of Appeals, ninth circuit, May 2, 1921, in Skeem et al. *v.* United States et al., held: "The purpose of the Government was to induce the Indians to relinquish their nomadic habits and to till the soil, and the treaties should be construed in the light of that purpose and such meaning should be given them as will enable the Indians to cultivate eventually the whole of their lands so reserved to their use."

In the case Conrad Investment Co. *v.* United States, it is held with reference to the waters of Birch Creek, a boundary stream on the Blackfeet Indian Reservation of Montana, that although the Indians after using the water for a time,

subsequently fail for a period of time to make use of it, yet such failure to make beneficial use of the water for the purposes of irrigation, shall not in any manner jeopardize their rights, should they at any future time desire to resume the use of such water for irrigation.

Some of the Government attorneys claim that under the principles laid down by the Winters decision, a purchaser of Indian land that has never been irrigated acquires with the land the Indians' implied water right, which he may thereupon convert into a vested right of the same priority as the Indians' implied right, even though such procedure would take the water from lands previously irrigated outside of the Indian reservation.

We believe that the principle laid down in the Winters decision—that the establishment of an Indian reservation in an arid region, reserves by implication a right to the use of water sufficient to irrigate the irrigable land of such reservation, or such part of the land that the Indians reasonably may be expected to use—is a measure of simple justice and fairness to the Indian and is essential to his welfare. We believe, however, that in making practical application of this principle, the Government and not the pioneers, should stand whatever losses may result from the Government's failure to protect the Indians. In our judgment the Government owes a duty to the pioneer as well as to the Indian. It should be borne in mind that the winning of the West is the work of the pioneer. The pioneer, acting upon the tacit if not the expressed invitation of the Government, have in a large measure subdued the western arid regions and made them habitable for man. They also assisted in the working out of the Indian problem, both in the days when the rifle was the accepted instrument for the solution of the problem, and also in these later days since more humane methods have been adopted, and the rifle has been discarded for the plow as the means of solution. They have in many cases brought civilization to the Indian and supplied him with a market for his labor without which the Government would have been under the necessity of supporting him in idleness. Had the Winters decision been promulgated in 1848 instead of 1908 it would have effectually barred the settlement and development of much of the arid region of the west, as in that case, the pioneer, knowing that there was a probability that at some time he would be required to relinquish his water supply to the Indian, there would have been little or no incentive for him to build irrigation systems and place the land under cultivation.

Your advisers feel that in all cases where the application of the principle promulgated in the Winters decision would result in the loss of water rights regularly acquired by appropriation and beneficial use, and in consequence considered valid under State laws, that the Government should provide an adequate water supply for the Indians in question, either by purchase of valid rights, or the construction of storage reservoirs for the impounding of flood or surplus waters, such purchase of rights or storage reservoir construction to be paid for out of gratuity appropriations.

As a matter of fact the purchase of water for Indian lands as opposed to the confiscation of water already being beneficially used on other lands is not without precedent. On the Yakima Reservation, Wash., Congress appropriated funds for the purchase of reservoir water for Indian lands, whereas had the principle of the Winters decision been enforced, white settlers who were using the stream flow would have been required to relinquish such water for the Indians.

The advisers fail to see any consistency in the application or practical working out by the Indian Bureau of the principle of the Winters decision. In some instances, as on the Walker River and Southern Ute Reservations, it is proposed to take the additional water needed for Indian lands from the lands of settlers where it is already being beneficially used. In the case of the Yakima Resreva-tion, neighboring white-owned lands in the vicinity of the reservation are left in undisturbed possession of the water already developed and the Government purchases storage water for Indian land, which, in the opinion of your advisers, is the only just and equitable manner of applying the Winters decision. On the Gila River Reservation of Arizona, the Pima Indians, who were irrigating their lands when first visited by the early Spanish explorers as early as 1540, having been deprived of their water supply by the irrigation development of white settlers upstream from them, a storage reservoir is being built to provide them a water supply, but it is now proposed that each acre of Indian land shall pay its pro rata part of the cost of reservoir construction, in the same manner as the white-owned lands outside the reservation. In other words the Indian lands are to be penalized at the rate of $50 per acre because of the Government's failure to protect them in their water supply. We can see no justice in this plan. We

believe the Government itself and not the Pima Indians should make good the failure of the Government to protect the Indians in their water right, and that by means of the storage now being developed, there should be restored to the Pima Indians, without cost to them, a water supply adequate for the irrigation of at least the maximum acreage they irrigated prior to the encroachment of the whites, which is what they would be justly entitled to under the fundamental principles of irrigation practice that are universally recognized in all the States throughout the arid region.

We urgently recommend:

1. That for each of the active projects of the Indian Bureau there be initiated at an early date a most thorough and searching investigation of the water supply, the work to be done by the project engineers or engineers specially detailed to the work, and all work to be done under the supervision of a well qualified and experienced hydrographic engineer.

2. That pending an accurate and reliable determination of the available water supply for each project, no further extensions to any project be made.

3. That after the determination of the water supply available for each project, and a determination of the water requirement of the land, all projects be reduced to the acreage for which there is a safe and dependable water supply, by excluding the less productive and less desirable lands.

4. That in all cases where the same can be done without jeopardizing the rights of the Indians, the laws of the States in which the Indian reservations are situated be complied with in the acquisition and the protection of water rights. With respect to some of the reservations this is already required by specific law.

5. That the principle promulgated in the Winters's decision be invoked and enforced with respect to all those reservations where necessary to secure an adequate water supply for Indian lands; but that in all cases where the application of this principle would result in the loss of water rights regularly acquired by appropriation and beneficial use, and in consequence considered valid under State laws, the Government should provide an adequate water supply for the Indians in question, either by purchase of valid rights, or the construction of storage reservoirs for the impounding of flood or surplus waters, such purchase of rights or storage reservoir construction to be paid for out of gratuity appropriations. Any other course, in our opinions, would be penalizing the rights of private citizens for the failure of the Government to properly protect the Indian in his water rights.

LAND AND ALLOTMENTS

The Indian in his primitive condition knew nothing of land ownership as we understand the term. Almost without exception his only use for the land was as a hunting ground, and, as a result of this barbarous mode of life, the land could sustain but a very small and widely scattered population. Before the advent of the white man the various tribes were for the most part constantly at war because of disputes over territory, and each tribe held such land as it could against the incursions of its neighbors. There were frequent conquests and shifting of tribes. Under such conditions, even though the Indian had been inclined toward agricultural and pastoral pursuits, his temporary and questionable tenure of the land would have been an effective bar to any progress in agriculture.

Later, when the Indian reservations were established, there was of course no individual ownership of land, but the ownership of the reservation was in the tribe.

The breaking up of the tribal estates or reservations and allotting or dividing the land among the individual Indians was provided for by the act of February 8, 1887 (24 Stat. L., p. 388), commonly called the general allotment act or the Dawes Act. Its purpose was to give each Indian his proportionate share of the land, thus creating an individual opportunity and responsibility, and providing an incentive to personal effort and initiative which is essential to the development and welfare of all human beings.

It was hoped by many of the overoptimistic friends of the Indians that the assignment of specific tracts of land to individuals would soon make them self-supporting.

In order to prevent the Indian from disposing of his land he receives a trust patent with restrictions upon alienation for a period of 25 years. The trust period may be extended, if deemed advisable, by the President. During the trust period the land can not be encumbered or sold without the consent of the Government. At the expiration of the trust period the Indian may be given a patent in fee as provided by the general allotment act; also patents in fee may be issued to Indians competent to handle their own affairs under the provisions of the

Burke Act of May 8, 1906. When a patent in fee is issued, the Bureau of Indian Affairs has no further control of the land.

Allotments of land on the irrigation projects under consideration vary from 10 to 80 acres in size but on most of the projects they are 40 acres each. As a result of the system of allotting usually followed, whereby every Indian, regardless of age or sex, received an allotment, the Indian family of average size has considerably more land than they can use at the present stage of their development, and in fact more land than the average white family in an irrigated country has or can use. On projects where 40-acre allotments have been made the average Indian family will have about 200 acres of land. It is of course impossible for them to use it. In such a case, ordinarily 40 or 50 acres or even less will be used by the Indian family, while the remainder, unless it is leased, will stand idle.

This situation, unless the land is leased, will exist over the entire project. Of the total area included in the allotments belonging to each family, usually but one allotment will be used, or partially used. The general result is that on the average Indian project, only a small part of the land will be used by the Indians, and this will be in small isolated tracts scattered over the entire project. This necessarily means that the irrigation system for the whole project must be operated and maintained for serving only a small part of the area that has been provided with irrigation facilities, and that the cost for serving this small acreage will be practically the same as it would be if the entire project area were being farmed.

The Indian usually is unable to pay irrigation charges even on the land he actually farms, so it can not be expected that he can pay such charges on his unused land. The irrigation operation and maintenance expense on Indian land not leased is usually provided for by congressional appropriations made for that purpose, which in most cases are reimbursable; that is, it is intended that the cost shall be repaid to the Government. The Indian being unable to pay this annual operation and maintenance cost, it is usually assessed or charged against the land.

In view of the fact that the system of allotting as applied to irrigation projects results in so much idle land, it would appear that smaller allotments should have been made, or allotments made only to heads of families, so as to restrict the allotted acreage, and hence the irrigation projects to much smaller areas than are included in the present projects, thus greatly reducing both the construction and the operation and maintenance cost. On many of the reservations, however, the apparent desire of those having in charge the allotting, was to divide all the irrigable land among the Indians, regardless of whether or not they would be able to use it, and thus prevent it from falling into the hands of whites. After this course was decided upon, the logical and laudable thing to do was to extend the irrigation system over the entire irrigable area, so that any Indian, regardless of his location, should be able to farm his land if he cared to do so. The principal reason, however, in many cases, for extending the irrigation system, was to initiate and protect the water right for as much land as possible, without which the land itself would be of little value.

The allotting system, as it has been applied to Indian irrigation projects, has two objectionable features, as a result of which only a small part of the irrigable land can be used by the Indians themselves: (1) It assumes that it is possible to make of every Indian a farmer, and (2) the speechless babe and the gray-headed man are given allotments, the same as the able-bodied head of a family.

It would not be expected, were we to take all the inhabitants of, say, a county of one of our western irrigated States, and place them on allotments on an irrigation project, that they would all become successful farmers. On what theory then can we expect it of the Indians, who are but a generation or two removed from barbarism? The experience on our Government reclamation and other irrigation projects built for white people, where the farmer is attempting to farm from choice, is that the majority of them fail.

THE INDIAN AS A FARMER

The coming of the Caucasian with his civilization meant for the Indian a revolutionary change in the method of his living, and a change against which he rebelled with all his might. As warfare and hunting became less and less their chief occupation, and as the herds of buffalo, or other wild animal life began to diminish, it became apparent that some new means of subsistence would have to be provided. It was but natural to look to the land. Some of the eastern tribes had practiced a limited agriculture in a crude way, the squaws doing the work,

and a few tribes in the Southwest had even progressed to the extent that they practiced farming under irrigation.

But the great body of Indians—the Sioux, Cheyennes, Utes, Crows, in fact all the Indians of the plains and the Northwest—not only had no knowledge of farming, but they had no disposition to acquire such knowledge. For generations hunting and warfare had been his occupation; work of all forms—at least, what we regard as work—was the business of the squaws. They were the beasts of burden, and for a warrior or brave to do menial labor was degrading. A warrior would prefer starvation rather than the disgrace or loss of caste that would inevitably result from his condescending to do the work of a squaw.

A necessary corollary of the reservation system and the extermination of the wild animal life on which the Indian in his primitive condition subsisted, was the ration system. The ration system made paupers of the Indians—converted braves into beggars. The ration system was adopted with the idea of assisting the Indian until he should become self-supporting on his own land. In many cases, however, with such annuity payments as were occasionally received from cessions of land, the Indian has been enabled to live according to his low social and economic standard without work.

The Indian's requirements for life, as prompted by his own effort and labors, are still very limited. Where he is compelled to work for what he receives, his ambitions confine his efforts pretty much to what food and clothing he needs, without accumulating any great reserve ahead. His ambitions in his present state of development, as a rule, carry him no further. If money comes from other sources, he will naturally relax his efforts and accomplish less by his own work.

On projects like Klamath, where the individual Indians have had incomes of $500 to $700 each from the sale of tribal timber, farming by Indians on the project has almost ceased. On the Yakima project, where the larger part of their land can be leased for $8 per acre per year, the income of 80-acre allotments is sufficient to support the owner. It is too much to anticipate that many will, for several generations at least, develop beyond the point on any project where they will do more than grow or produce sufficient food to satisfy their limited requirements. This means farming on a small scale. Commercial farming—growing crops on a large scale for the markets—is beyond the conception of most Indians, and will remain so until his development reaches the point that he is ambitious to have something more than a mere living, and is willing to work for it. The planning of the larger projects has in no way taken these facts into consideration, but, on the contrary, they are constructed and planned for commercial farming.

Most of the project developments have been prompted by the fact that the Government had to ration a great many of the able-bodied Indians through a part of the year because there was insufficient means for them to earn a living. With the development of the reservations or the surrounding country by the white settlers, a demand for the Indian's labor has been created, and many of them prefer to work as laborers in the fields or in the towns, than to farm their own lands.

It is no more logical to assume that all Indians will adopt farming as a means of livelihood, than it is to assume that all people of our own race would adopt that occupation. Allotments, however, were made to Indians—men, women, and children—regardless of the desire or ability of the individual to make use of the land by his own efforts.

Need for advice and assistance.—If the Indians are to make a better use of their agricultural lands, the Indian Bureau must teach them through proper instructors and demonstrations the methods to follow in order to gain a fair return for the energy spent. Indian farmers have been supplied to assist and teach the Indian to farm, but the type of men employed and the work required of them are such that the effort has, as a rule, been a failure. Men for this position are usually employed at a low salary and either have little ability or are assigned to other duties that occupy much of their time and attention. The Indian is quick to realize the lack of ability in such men and consequently their efforts are of little avail. A man for this class of position should be of the type usually employed as county agent or farm advisor and should be paid a salary commensurate with his ability. He must have understanding of the Indian's problem, be patient and able to give his unlimited time to such work. In order to keep up the Indian's interest he must be in frequent touch with him, hence his field must be limited to a comparatively small number of persons. Demonstrations must

be made on the individual Indians' farms rather than on some demonstration farm, in which the Indian has no personal interest.

Need for financial assistance.—Very few of the Indians possess the capital, stock, tools, or equipment with which to clear and level the land and construct the necessary laterals upon their allotments, and this was especially true when the Government irrigation systems were completed, making water available for irrigation. Some, of course, made attempts to place their allotments under cultivation, but only in exceptional cases was it done in such a way as to make possible efficient farming. Some small advances were made to assist them with the improvements, such as building small houses (many of which have not been occupied) or the purchase of seed—which was sometimes used as food instead of being planted as intended.

White settlers on other irrigation projects under similar conditions have failed. Indians need such assistance even more than the whites.

The necessities of aiding the Indian to get started have to a certain degree been recognized, and the improvement lease has been utilized by the Indian Bureau to meet this condition. This, however, solves the problem by a roundabout instead of by a direct method. The Indian is more interested at the time water first becomes available for the irrigation of his allotment, and if he could at that time be put to work upon his land under proper supervision there would be a greater chance of success than when a major part of the land has to be placed under an improvement lease in order to improve it, with the loss of three to five years' time.

Most of the projects have passed the point where the most good could have been accomplished by the Government's advancing the funds to prepare the land for farming. The Florence-Casa Grande project is one, however, where the opportunity exists for the Government to give assistance of this kind. The Indians of that reservation have had a most discouraging experience. At one time they farmed a considerable acreage, but the gradual encroachment of white settlers on the upper Gila River has taken their water. Not only has the acreage farmed by the Indians decreased from year to year on account of the decreasing water supply, but those who have persistently tried have often lost most of their crops due to no fault of theirs. The Coolidge Dam is to be completed about the middle of the calendar year 1929, and by the season of 1930 there should be sufficient water available for the beginning of farm operations. Some of the Indian allotments will be ready for farming as soon as water is available. Others will require considerable work. The advisors are of the opinion that it would be advisable for the Government to clear and prepare for irrigation a small area for each Indian who desires to farm, the cost of such work to become a lien against the land. Consideration should also be given to placing the activities of these Indians under farm advisors who are at least as well qualified for their work as the county agricultural agents who are now regularly employed in the agricultural communities peopled by our own race.

Ill health interferes with farm work.—The failure of any Indians of some tribes to develop their land and to become self-supporting is attributable to ill health. Many are affected with inherited diseases particularly with tuberculosis. On the Fort Belknap Reservation it is reported that about two-thirds of the Indians have tuberculosis. The prevalence of tuberculosis is frequently attributable to inadequate and insanitary housing conditions. On some reservations the Indians live in tents tepees, or temporary shacks; on others, they have houses, but the houses, especially in winter, are closed tightly, and without means of ventilation. Another principal cause of ill health is undernourishment; many Indians do not have sufficient food, or food of proper variety. Among some tribes the drug habit is increasing at an alarming rate. It is stated by some who are apparently informed that more than half the Indians in some tribes are drug addicts.

About 25,000 Indians are affected with tuberculosis and 30,000 with trachoma, a dreadful disease of the eyes, which if not given proper treatment, results in total blindness. As the result of increased health activities of the Indian Bureau, it is reported that the general death rate among Indians has been reduced from 32.24 per thousand in 1913 to 22.33 per thousand in 1920. The first hospital among the Indians was established in 1882. At present there are 96 hospitals, with 178 doctors and 146 nurses. The turnover of physicians, however, for 1927 was 56 per cent and for nurses 122 per cent.

The Indians on several reservations complain bitterly of the alleged inefficiency and incompetency of the physicians the Government employs to care for their health. An instance of this is the following quotation from a letter addressed to the Commissioner of Indian Affairs by the Crow Tribal Council.

"The question of our health is to us the most important question we have to deal with. All others dwindle away as insignificant in comparison; we have, as you can testify, requested you and your subordinates for the appointment of a physician and surgeon, who, in the real sense and meaning of the term could be called one, to these repeated entreaties, though the relation and meaning of a competent doctor to our health and future is a question undebatable, yet for one reason or another you have steadily ignored our request.

"As it is now, $1,200 per annum doctors are sprinkled about here and there through the Indian country, and in so doing we of course received ours, with the natural result that in serious cases of illness we must either resort to the services of competent physicians on the outside at prohibitive expense to ourselves, or in the event that we can not afford such services, we are obliged to accept that offered by your $1,200 physician with results which are often very unsatisfactory and sometimes disastrous.

"A most peculiar situation that exists here is as follows: You pay our reservation doctors $1,200 to $1,400 per annum, while you allowed the man who herded our cattle out in the hills and who appears never to have spent any period of time in school, neither incurred the usually large money expense necessary in acquiring an education, $1,800 per annum. The doctor on the other hand, who, before he can secure a diploma, entitling him to practice medicine, must spend years of study and thousands of dollars, gets less than one who spends nothing. Thus the system of the Indian Bureau as shown elevates the uneducated above the educated. From the above, it appears that a premium is offered to ignorance rather than education, and the cattle roaming over the hills are of more value than the health and lives of Indian people.

"Pyorrhea and trachoma are securing a foothold among us. We realize that to effectively combat these afflictions, which we are told are dangerous beyond belief, we should have physicians who are specialists along these lines. But what are we to do when your policy prohibits the employment of such. It is our opinion, based on experience, that the physician you have supplied us with is incompetent to cope with the situation."

Earnings and income of many Indians inadequate for proper support.—Among some Indian tribes, the average annual per capita income from all sources is so small that it is a matter of surprise how they eke out an existence. From the most reliable data obtainable concerning this matter, it is estimated that the average total annual income of Indians on the reservations included in this study, are as follows: Fort Peck, $30; Blackfeet, $55; Flathead, $65; Walker River, $105; Gila River, $120; Fort Hall, $130; Wind River, $133; Southern Ute, $135; Colville, $135; Fort Belknap, $137; Toppenish-Simcos, $235; Satus, $235; Crow, $235; Ahtanum, $325; Colorado River, $343; Uintah, $350; Klamath, $540; Wapato, $670.

As for the two tribes having the largest incomes, the Klamaths and the Yakimas, the Klamaths receive annually $500 each from timber sales; and the Yakimas on the Wapato project receive annually $650 each from land rentals. Hence they do practically no farming.

NECESSITY FOR FARM ADVISORS

It is our opinion that the Indian Bureau, in failing to provide properly qualified and experienced men to instruct and advise the Indians in their farming operations, is neglecting its greatest opportunity to assist them in becoming industrious and self-supporting citizens. It is of course true that there are a few well-qualified and efficient men among the school or agency farmers now employed, but the vast majority are neither qualified nor fitted for the work they are attempting. Too often, it is a case of the blind leading the blind. One principal difficulty with the present system is that most of these school farmers are required to act as assistant or subagents in their districts, and hence can give very little, if any, time to the actual work of instructing and assisting the Indians in farming. As one superintendent explained, "they procure and distribute seed, implements, livestock, negotiate leases, make collections of cash and crop rentals, adjust disputes between Indians and lessees, appraise Indian lands to be sold, and handle the papers involved in such sales, see that children attend school, issue rations, and many other things," and then, if they have any time left, they teach the Indians the art of farming.

On one reservation, some Indians stated the farmer had not been to see them in three years. On another, the Indians complained that the superintendent required the farmer to put in all his time working about the school and agency.

On several of the reservations the Indians complained that the farmers the Government supplied to teach them, knew less about farming than those they were attempting to instruct. Quite frequently Indians referred to the low salaries the farmers are receiving as evidence of their incompetency, stating that if they were efficient and competent they would not work for what the Government was paying them.

It can not, in our opinion, be said that a serious attempt has actually been made to get the Indians interested in farming until a much higher type of man is employed as instructor than at present.

The success attending Superintendent Campbell's efforts on the Blackfeet Reservation, is an indication of what might be accomplished on many reservations if the proper sort of supervision and encouragement is offered. It would be a measure of economy to provide such instruction, since it would materially reduce the time until the Indians would be self-supporting and Government supervision could be removed.

LEASING OF INDIAN LANDS

The general allotment act, or Dawes Act of 1887, provided for the allotment of a tract of land to each and every Indian. The fact that many allottees would be physically incapable of using their land was apparently overlooked, and no provision was made for leasing. This situation was corrected by the act of February 28, 1891 (26 Stat. 794), which provided that in case of incapacity by reason of age or other disability, the land of an allottee might be leased for a term not exceeding three years for farming or grazing purposes.

In 1894, the scope of the leasing law was extended so as to permit of leasing more land by making it read "by reason of age, disability, or inability" and the period of lease was extended to five years.

There have been numerous changes in the leasing laws, particularly in increasing the period of lease. By the act of March 5, 1921, the superintendent or officer in charge of a reservation may approve leases of individual allotments for farming and grazing purposes without submitting to the Washington office. Leases may now be made for a period of 10 years. There are special leasing laws applying to certain reservations, particularly Yakima, Fort Belknap, Uintah, Shoshone, Crow, and others.

Indians have more land than they can use.—As a result of the system of allotting practiced on the various Indian irrigation projects, the average Indian family, as a rule, has much more land than they themselves can utilize. As first proposed, it was planned to restrict leasing to the allotments of children and the aged or infirm. This plan would suffice for a humid country, but was not satisfactory for an irrigated region.

Many Indians unable to improve farms.—The cost of improving or rather making an irrigated farm, involving clearing, leveling, bordering, fencing, etc., and getting the first crops started under irrigation is a very difficult and expensive task, and one requiring far more capital, ingenuity, and perseverance than most Indians possess. In fact, so many farmers, even those having ample capital, have failed on the projects of the Bureau of Reclamation, that the bureau has adopted the plan of carefully selecting its project settlers, requiring of them, in addition to ample capital, actual experience, and such other qualifications as are known to be necessary to enable them to have a fair chance of success.

If such a small proportion of our own race can make a success of irrigated farming that it is necessary to make such careful selection in order to obviate numerous failures, how can it be expected that every Indian can succeed as an irrigation farmer. Only the very exceptional Indian can make of his allotment an irrigated farm. For the vast majority, it has been necessary to have recourse to what is termed the improvement lease in order to improve the allotments on the various irrigation projects.

The land is leased, the lessee having the use of it for a certain specified period, usually from three to seven years, in consideration for his improving it, and turning it back to the Indian at the expiration of the lease, with a part or all of it in some specified crop.

It is particularly essential on an irrigation project, for two reasons, to improve the land as soon as the project is completed, and to farm it continually: (1) Because of the necessity for perfecting and holding the water right, and (2) in order that the irrigation charges may be paid from the returns from the land. On many of the Indian projects the operation and maintenance and construction costs are met by Congressional appropriations, which are reimbursable. Such charges are in most cases a lien against the land. These charges on lands not in

use, or on which the annual charges are not being paid, are thus constantly accumulating, and in some instances are already equal to or greater than the value of the land. It is therefore evident that the land must be leased on terms that will permit the lessee to meet these charges from the production of the land if the Government is to be repaid the cost of constructing, operating, and maintaining these works.

Necessity for leasing.—Even though the able-bodied Indians were given ample assistance so that they themselves could improve their lands, the allotments of children or the incapacitated would either have to be leased, or improved as a Government operation, in order at least to protect the water right.

The improvement lease which has been in use was a necessity growing out of the lack of funds of the Indian to improve his land or the Government's failure to complete the reclamation of the land to the point of being ready for production.

It was of course expected, or rather hoped, that at the expiration of the improvement lease, when the land was turned back to the Indian, that at least the able-bodied Indian would take up farming operations where the lessee left off and become a successful farmer. But, as is so frequently the case where the Indian is concerned, the plan in most instances has been a failure. Frequently the Indian refuses to do anything with the land, or he may use only a small part of it in a very perfunctory manner. If it is in a country where there is a demand for the leasing of improved land, he much prefers to lease it for a cash or crop rental and live off the proceeds rather than to work the land himself. The Indian justifies himself in this procedure by the argument, which is not without considerable merit, that he does not understand farming, and that by renting the land he gets much more out of it than he would by farming it himself. The Indian Bureau, or rather the reservation superintendent, justifies the leasing of the land by the argument that the Indian refuses to use the land, and that it is necessary to lease it in order to protect the water rights and to pay irrigation charges, which are both good and logical reasons.

Present leasing policy often enables Indians to live in idleness.—The effect on the Indian, if the proceeds of the lease go to him, is to encourage indolence, improvidence, and all their accompanying vices that the Government has labored so assiduously and so expensively to eradicate from the Indian character. It is in effect a virtual return to the ration system, by which the Indian enjoys the rewards of toil without experiencing its fatigues and inconveniences. By taking away the incentive to labor it defeats the very object that was sought to be attained by allotment and the construction of the irrigation works which was intended to incite him to personal effort in his own behalf by giving him something tangible that he could call his own.

An example or two may illustrate this feature of the situation. On the Wapato unit of the Yakima Indian project the acreage farmed by Indians has shown a continuous decrease. At the time of the inspection of the project in 1927, covering nearly a week, only one Indian was found actually working on his farm. They lease their lands for $6 to $10 per acre per year, and live in idleness on the income. In some instances where the records of the Indian Office show land farmed by Indians it was observed that the actual work was being performed by Japanese. It is a well-known fact that many of these Japanese are actually lessees, and the claim that they are laborers in the employ of Indians or white lessees is merely a subterfuge to evade the State law prohibiting leasing to Mongolians.

If the purpose in building the Yakima project was to enable the Indian to live in indolence, improvidence, and profligacy, and to enable whites and Mongolians to reap profits from a development made under the guise of a benefit to the Indian, it is a wonderful success. If the purpose was to make of the Indian a self-supporting, intelligent, and law-abiding citizen, it is a dismal failure.

On the Klamath Reservation, as a result of annual payments of $500 to $700 each from the sale of tribal timber, which gives the ordinary Indian family an income of $2,000 or $3,000 annually, conditions are still worse than at Yakima.

The methods of leasing heretofore employed have been what might be called short-term leasing, five to seven years, with few as long as 10 years. In our modern agriculture, the successful farmer must look ahead to a rotation of crops that may exceed this lease term. The improvement lease has been temporary in nature and has often resulted in depletion of soil fertility. Care should be used in the selection of lessees so as to secure successful farmers, and conditions of leasing must be such that it will attract this class of farmers. The leasing period should be extended under certain conditions to a term as long as 20 years. New legislation will probably be needed in most instances to sanction such a course. If the Indian does not farm, or has more land than he can use, the income from leasing,

especially if the owner be an able-bodied Indian, should in large part be applied in liquidating construction charges. Under the present system it is necessary to have the Indians' consent to lease his allotment. Instances were brought to our attention where land were not being utilized because the Indian refused to sign the lease, holding back with the hope of getting a larger cash rental than had been offered, in many cases, more than the land is actually worth. Land which the Indians can not, or will not farm should be leased, even though the operation and maintenance costs are all that can be secured. Authority should be secured by proper legislation so that the bureau can lease idle lands regardless of the wishes of the Indian. The leasing should be coordinated with the irrigation work and not handled as a separate activity as at present.

It is recommended:

1. That all irrigable land which the Indians are unable to utilize, be leased with a view to its improvement and utilization in order to protect the water rights, and to derive some income from which to pay irrigation charges.

2. That, if necessary, legislation be secured to permit of leasing irrigable trust patent Indian land without the consent of the allottee, and to permit of leasing irrigable Indian tribal land without the consent of the tribe.

3. That legislation be secured to extend the lease period in exceptional cases to 20 years with the purpose of encouraging fruit development.

4. That, if necessary, legislation be secured authorizing the Commissioner of Indian Affairs to withhold lease proceeds from allottees in all cases where such action may be deemed advisable for the enouragement of industry, and to apply any part of such proceeds to the repayment of any irrigation charges due, or to become due on the lands of such allottees.

5. That each able-bodied Indian having no other occupation, be required to farm in a satisfactory manner such part of his land as in the judgment of the Commissioner of Indian Affairs he is able to operate, and that upon his failure to do this, any proceeds from that part of his land that is leased, may be withheld and applied to the payment of irrigation charges, or for other purposes.

6. That on all leases of irrigable land, the lessee be required to pay the annual operation and maintenance assessment in advance.

7. That in making leases of irrigable lands, it be required that the leases shall be signed both by the superintendent of the reservation and the project manager or engineer, and that each shall retain a copy of all leases in his files.

8. That the project management or the supervising engineer make all collections of irrigation charges on leases of irrigable lands.

ACQUISITION OF INDIAN PROJECT LANDS BY WHITES

Disposal of surplus or unallotted land.—A result that naturally followed the allotment of lands to the individual Indians on many of the reservations was the disposal by sale or homestead of the surplus or unallotted land. Usually this was provided by special legislation for each of the various reservations. Generally, such surplus land was, by agreement with the Indians, ceded or relinquished to the United States for a specified consideration, after which it was, by act of Congress, opened to homestead entry under the general land law, or an amendment or modification of that law providing for a small or nominal purchase price. In some instances, the United States, in effect, simply acted as agent or trustee in the disposal of such surplus lands for the Indians and paid over to the Indians, or expended for their benefit, the proceeds from the sale of such surplus lands.

A double benefit was to be derived from this. The proceeds from the sale were to give the Indian a start as a farmer, provide him with a house in place of a tepee or wickiup, furnish him tools for farming, material for fencing, and everything that would place him well on the road to self-support.

The second advantage that was to come to the Indian from this breaking up of the reservation was the coming of white neighbors, who, in taking up farms all about him, would stimulate him by their example, and their standards of living. So civilization would come to the Indian.

In sections where allotments were made and surplus lands sold, both these conditions came about in a measure; but the results were frequently very different from those anticipated by the proponents of the Dawes Act. The surplus lands, where at all desirable, were speedily taken up; the influx of white settlers began as soon as permitted. This brought along with it the schools, the towns, the general advantages of the white man's way of living, which it was hoped, would hasten the development of the Indian into those same ways. The reservation lands that were in this manner opened to settlement were usually

segregated from the allotments so that the allotted area was usually in tracts of considerable size, but the topography of the country was never considered. This resulted in a condition that brought both Indian and white lands under the same irrigation system.

The system of allotting lands to all Indians regardless of age or sex, and frequently years in advance of the planning of the irrigation system, and the policy of selling Indian lands soon resulted in many Indian allotments passing into white ownership.

Sale of lands of deceased Indians.—The lands of deceased Indians may be sold when necessary to divide an estate. The land of an allottee holding trust-patent may be sold on his petition if such sale is deemed to be for his best interest. In both cases the sale is initiated by the superintendent of the reservation who appraises the land, advertises the sale, accepts and opens the sealed bids submitted, and forwards them with his recommendations to the Bureau of Indian Affairs for approval by the Secretary of the Interior.

It is reported that on the various reservations in the United States for the period 1911 to 1926 inclusive, a total of approximately 2,000,000 acres of Indian inherited land was sold for an approximate total price of $37,000,000; and approximately 3,000,000 acres of trust patents lands were sold on petition of the allottees for approximately $46,000,000. Such of these lands as are included in an irrigation project, when sold, carried with them the rights that the Indian had in the irrigation system, but in a number of cases the sale price did not carry with it the cost of its share of the irrigation plant nor was the cost of the same protected in the sale contract or deed. The methods of allotting and selling Indian lands has frequently placed the Indian Irrigation Service in the position of operating and maintaining irrigation systems more for white owners than for the use of the few Indians under the system.

Fee patent Indians frequently sell land.—Indians holding trust patents are subject to the exclusive jurisdiction of the United States. The act of June 2, 1924, conferred citizenship on all Indians, but did not repeal the provisions of the Burke Act of 1906 that Indians holding trust patents should be subject to the exclusive jurisdiction of the Federal Government.

When a patent in fee is granted, all jurisdiction of the Indian Bureau is at an end as far as the individual Indian is concerned, and he is then free to dispose of his property and money as he sees fit.

It is known that many Indians as soon as the patent in fee is received, sell their lands. Unfortunately, no records are kept, so it is not accurately known what proportion of fee patent Indians dispose of their holdings, but it is variously estimated by reservation superintendents that 70 to 90 per cent of those who receive fee patents immediately sell their land.

The authorization of patents in fee for competent Indians was designed for the purpose of freeing educated and industrious Indians from "wardship." In general, however, the freedom from restrictions was valued because it made possible the sale of the land. An application for a patent in fee is in most cases a necessary preliminary to a sale of the land.

On the Crow, Wind River, and Unitah projects particularly, a considerable acreage of land, both Indian deceased and fee patent, has been sold, and no provision made for collecting the irrigation construction charge from the purchaser, and the Indians having received the proceeds from the sale of the land and in most cases having disposed of it, collection can not be made from the former Indian owners. As a result there is no possibility of collecting the construction charge on such lands. No record has been kept of the acreage of such lands.

THE QUESTION OF REIMBURSEMENT OF IRRIGATION CHARGES

Reimbursement on Bureau of Reclamation projects.—Reporting on April 10, 1924, concerning the irrigation projects of the Bureau of Reclamation, the Special Advisory Committee on Reclamation consisting of nationally known authorities and experts stated that of the $143,000,000 then expended in building irrigation works, $18,561,146 or 13 per cent would never be recovered, with a probable additional loss of $8,830,000 or a total of $27,391,146 (19 per cent) representing construction to supply water for lands of little or no productivity.

In their report it is pointed out that the intrinsic return value of irrigation projects is not established by the cost of building irrigation works, but by the actual crop production of the lands reclaimed.

"Financial assistance to settlers unable to obtain capital with which to improve and equip their farms on account of high interest rates and other difficulties was recommended in the creation of a credit fund from which farmers on projects

may borrow money with which to make permanent improvements, purchase agricultural equipment and live stock."

The following statements from their report are considered applicable to the Indian irrigation projects:

"* * * Construction was done piecemeal and over many years. The delayed construction and the irremediable errors in the original locations increased the project costs and the burden of the water users, who were to repay construction costs from crop incomes.

"The construction costs are in almost every instance larger, in some cases several times larger, than the original estimates. This fact, while regrettable, can not be charged to any one cause. One principal cause was including works not provided for in the original estimates, such as larger dams, also lateral ditches and drainage works. * * * Estimates should be made with such care, and construction pushed with sufficient rapidity, to secure reasonable agreement between estimates and costs.

"Success can come to future Federal reclamation ventures only if projects are authorized upon a thoroughly scientific consideration of the probable power of the project to enable the farmer to repay construction costs and to win a living from the irrigated lands. Community and political demand to secure projects should be considered only after full knowledge of the feasibility of a proposed project has been secured. Once a project is located, the errors in the choice are felt to the last day. The relief that can now be afforded on existing projects is to classify the lands upon the basis of a scientific survey and place equitable charges upon each class in proportion to its power to produce.

"* * * Reclamation by irrigation is the result of the joint efforts of the engineer and the farmer. The engineer builds the irrigation works; the farmer must pay for the works and make a living from the reclaimed lands. * * * There can be no irrigated farm without the competent engineer; but there will be no payment for the works nor community development under them without the successful farmer. * * * A fundamental error was made in believing that the construction of irrigation works would of itself create irrigated agriculture. * * * Attention has been centered almost entirely on engineering features; settlers were accepted without capital or experience. They were not organized to work together, but were left to struggle without sufficient aid or direction to complete what the Government had only begun. It has been demonstrated that the Government can build irrigation structures of the highest quality; but how farmers on the Federal irrigation projects can repay the cost of these structures within reasonable time limits, is yet to be demonstrated.

"The project settlers, particularly on the public lands, were unselected as to fitness by experience or financial ability to undertake irrigation farming. Many entered on the venture with little conception of the expenses or physical obstacles they would meet in creating a farm. * * * The inexperienced farmer should have been given more and better information and advice; the poor farmer, with honest courage but little or no capital, should have been provided with proper facilities; the farm with a rough, rolling surface, should have been leveled; the greedy owner of private lands, ready to trade upon the natural desire of vigorous, hard-working men for independent homes, should and could have been squelched; the good farmer, with small business capacity, should have been given the assistance of cooperative organizations for buying and selling; all should have been supplied with intimate advice, from competent official advisers, on all farm matters; and by every effort the way should have been made easier for the water user, who not only profits by the labor and skill of the engineer, but who also absorbs engineering mistakes and pays engineering bills.

"* * * A dependence on Federal paternalism has settled down upon nearly all the projects and a corresponding bureaucratic tendency has grown up within the Reclamation Service. The water users have come to look upon themselves as wards of the Government, a specially favored class with special claims upon governmental bounty; and the Reclamation Service has been tempted to accept this definition of the water users. Nothing could be more detrimental to the progress of a venture which demands, first of all, individual courage and independence of the people concerned.

"* * * State participation in selections of projects and in their development would lessen political pressure for projects of doubtful merit and help to lessen the danger of contralized control.

"* * * Plans and policies must be formulated which will insure competent investigations of all the conditions which affect the value of a project both to the Government and the settler. It must fix conditions as to the qualifications of

settlers as to capital and experience, which will help create communities able to meet the great demands on them in the way of money for development and ability to use soil, water, and climate, as success in irrigation requires. Without these things Government irrigation in the future will provide temptations rather than opportunities.

"* * * Large losses, running into millions of dollars, will have to be assumed by the reclamation fund. A part of the investment will be repaid. * * * This result comes from the location of projects without recognizing the limitations of soil and climate and available markets."

Among the recommendations of the Special Advisory Committee on Reclamation that are peculiarly applicable to Indian irrigation projects are the following:

"That no reclamation project shall be hereafter authorized until all privately owned land in excess of a single homestead unit for each owner shall have been purchased by the United States or by contract placed under the control of the Reclamation Bureau for subdivision and sale to settlers at an approved price.

"That in the settling and disposition of farms upon projects, the Government should examine into the qualifications of the prospective settlers who must have industry, experience, character, and capital. Only these (lessees) who have reasonable prospects of succeeding should be permitted to settle on projects.

"That no new projects or extension of existing projects shall be authorized until full information has been secured concerning water supply, engineering features, soil, climate, transportation, markets, land prices, probable acre cost of development, and other factors upon which the success of a project must depend. That all such information shall be secured through designated representatives of the Departments of the Interior, Agriculture, and Commerce, who shall, after careful investigation, make to the Secretary of the Interior a report upon the feasibility of the project or the extension of an existing project, having in mind primarily the creation of opportunities for actual settlement and farm homes and the repaying of the total investment made by the Government."

Considerations relative to reimbursement on Indian projects.—Beginning in 1867 and continuing until 1914, except for a few projects that were charged to or made reimbursable from the tribal funds or resources of the Indian tribe affected, Indian projects were built out of funds provided by congressional appropriation acts in which nothing was said of reimbursement and hence considered as gratuities or gifts to the Indians, to assist in their civilization and to enable them to become self-supporting. For many years Congress has regularly made large appropriations from the Treasury for the support and civilization of the Indians. For several years past these appropriations have ranged from ten to twelve million dollars annually, about one-half of which is expended in education alone.

It is reported by the Indian Bureau that since 1871 about $500,000,000 has been expended in behalf of the Indian.

By the law of August 1, 1914, Congress not only declared that all Government funds thereafter to be expended for irrigation but also that all funds theretofore expended for the same purpose on Indian projects should be reimbursable—that is, repaid into the Treasury.

By this law about $3,000,000 that had up to that time been considered as a gratuity was made reimbursable.

The law of August 1, 1914, providing for reimbursement of Indian irrigation projects, particularly the retroactive feature, has been the subject of much discussion and much bitter criticism by Indians and many friends of the Indians, as well as by many officials of the Indian Bureau. Congressman Hayden, of Arizona, in the committee hearings of the Sixty-ninth Congress on the condition of various Indian tribes, act of June 30, 1919, referring to such an irrigation appropriation stated that the Congress understood it was a gratuity, the Indians understood it was a gratuity, and the Indian Office understood it was a gratuity. Assistant Commissioner of Indians Affairs, E. B. Meritt, is quoted as stating: "I believe those reimbursements could not be enforced if taken into the courts."

It is believed by some that the reimbursable feature of the law of August 1, 1914, was inserted in the law for the purpose of making it easier to get appropriation bills for Indian irrigation through Congress. Whether or not this was actually the purpose of any of the proponents of the law it undoubtedly has made it less difficult to secure such appropriations.

As more fully explained in another section of this report it will readily be appreciated that a very large part of the Indian irrigation work done prior to 1914, and practically all of that done prior to 1905, was very unsatisfactory and was very wastefully done. In many instances the irrigation systems built in those early days have been partially or wholly abandoned as useless, and succeeding generations of Indians are asked to pay the Government for expenditures

made for the purpose of benefiting their ancestors, even though the sole benefit, in many instances, was that it may have afforded them temporary employment.

As a matter of fact not a little of the irrigation work done since 1914, as an inevitable result of the inadequate organization having the work in charge, is in many respect unsatisfactory and unnecessarily expensive.

In consideration of the way in which the Indian irrigation work has, in practically all instances, been conducted; particularly that much of it was done largely, if not primarily, to give the Indians employment and teach them to work; that in order to make employment for the greatest number possible inefficient methods and equipment were often pruposely used; that much of the work was done without engineering advice or supervision; that much of it has been abandoned or rebuilt; that much of it has been done piecemeal—that is, spread out over a long term of years, involving excessive overhead; that in many instances there were no comprehensive plans but projects have just grown up in a haphazard way; that in many instances there have been frequent changes in plans; that many of the projects have already been extended over larger areas than the water supply available will serve; that many projects contain large areas of nonirrigable or unproductive lands; for these, and many other reasons that might be mentioned, it is a matter of great difficulty to arrive at an equitable basis on which reimbursement may reasonably be expected.

The advisers are of the opinion that for those projects that have been under construction for many years, and the construction cost reimbursable is not fixed by existing law, a valuation survey offers the only possible and the only equitable method by which to arrive at the amount of construction cost that landowners reasonably, and perhaps legally, can be required to pay. This would apply to all projects other than Fort Hall or such projects whereon the amount to be reimbursed is fixed specifically by law at considerably less than the actual cost of the work or its replacement value.

The object of such a survey would be a determination of the replacement cost or value of all useful and necessary features of the irrigation systems of each of the projects. Such a survey would exclude from the amount to be repaid the excess cost involved in construction primarily to give Indians employment; excess cost resulting from piecemeal construction; excess in cost of unnecessary and unusual types of construction over the cost of necessary and usual types; cost of structures that fail to function, as the conduit of the Sacaton Dam; cost of replacements made necessary as result of improper design or workmanship in the first instance; and cost of all appurtenances not a part of the irrigation system, as the Sacaton Bridge.

Trend of legislation affecting reimbursement.—From the fact that the Indian irrigation projects are in the same general territory as Federal reclamation projects there is a tendency to consider the Indian projects in the same light—that is, from the standpoint of profitable agriculture and the return of the funds invested in irrigation works.

That Congress considers the return of the expenditures a matter of secondary importance is indicated by the San Carlos legislation, which was recently passed. In that case it appears that there is no intention that there shall be collections from Indians so long as they own the land. Collections are to be made only when the land passes to whites. With respect to several other projects, as for instance, Fort Hall, Uintah, and Southern Ute, it is provided that the lien for the cost is not effective so long as the land is occupied as a home by the Indian or his heirs.

Indians unable to pay irrigation charges.—In our judgment it is useless, at the present stage of his agricultural development, to expect the Indian, except in a very few instances, to pay either irrigation construction or operation and maintenance charges on land that he operates himself or that is not leased. As a matter of fact we believe that the legislation requiring reimbursement, particularly the law of 1920, has in a considerable number of instances caused him to slow up or to lose interest in the development and use of his irrigable land. Many of the Indians profess to see in this legislation a scheme of the Government to confiscate their land by accruing the irrigation charges against it until these charges exceed the value of the land.

In some instances an Indian may have 40 or 80 acres of irrigable land. He may have inherited a like amount and may be attempting to cultivate some of it. He may be able only to use a small part of it, but he is called upon to pay the irrigation charge on the entire irrigable area that he possesses; on the land not used, as well as the land used. If he grows alfalfa, there is no market for his surpius, and the result is that if an effort were made to enforce collection of the irrigation charges against this Indian, it would not only be impossible to collect

but it would probably discourage him so that he would give up all efforts at farming. For this reason, in many instances, the Indian is anxious to sell his land. As a general condition Indians everywhere object to paying irrigation charges, and in but few instances are paying them, and then never willingly. In all but a few exceptional instances it is a physical impossibility for them to pay, and, in general, if efforts are made to enforce payment, they give up trying to farm.

Inconsistency of legislation concerning reimbursement.—Attention is called to the inconsistency of the legislation relating to reimbursement. On some of the reservations Indians are required by law to pay both construction and operation and maintenance charges, while on others it is specifically provided that they shall not pay irrigation charges—either construction or operation and maintenance—and on the Fort Hall project, lands leased for a period of less than three years are by law exempt from irrigation charges.

Many project farmers demand reduction in irrigation charges.—On many projects there is an insistent demand by whites who have acquired land that the irrigation charges to be repaid by them be arbitrarily reduced to an amount that, in their opinion, they are able to pay. Their opinion or conclusion as to what they are able to pay is of course based on present economic conditions.

Conditions are constantly changing. What may be a high construction charge to-day may be a reasonable one to-morrow. The Government's policies must change to meet conditions, if justice is to be done both to itself and to the water user.

The Government is interested in the return of its money with reasonable dispatch under conditions that are not burdensome to the water user. The water user is more interested in the rate at which the payments are to be made than he is in the total payment.

On one project visited, which is less than one-third farmed, a number of meetings were attended at which the white settlers concertrated upon the one proposition that they were unable to pay more than $40 per acre distributed over a term of 40 years, although the construction costs are now approaching $50 per acre and construction not yet completed. Yet the Government is urged to spend more money to bring in other lands on this project and to supply funds for the construction of an electric transmission line to supply the farmers of this sparsely settled section, although the revenues from the service would not keep up the depreciation of the system.

If under present economic conditions the water users state they can meet a $40 payment within 40 years, what would be their ability to pay with no more sacrifice if sugar factories and cheese factories, creameries, and other industries were developed with more good highways so that they could readily market their produce; and the project was fully under cultivation?

In our opinion no construction costs that were legitimately expended in building the present system or work that will contribute to the final completion of the project should be written off. The annual rate fixed for meeting the charge is the one important thing in the present economic status of the project.

ESTIMATES, COSTS, AND COLLECTIONS

Estimated costs.—Many of the Indian irrigation projects have gradually grown up by extensions or enlargements made from year to year over a long period of time to the small ditches that were first built 30 years or more ago. These projects were usually begun by constructing small ditches to irrigate plots of ground along the streams where the Indians had been used to living. The work was done by the Indians, frequently by hand methods, and often the Indian agent or Indian school farmer acted as engineer or foreman. Much of this work was necessarily crude and simple, as even the white man of that day knew but little of irrigation. Frequently this early work was done largely as a means of teaching the Indians to work and of supplying him with labor for which he could be paid so as to avoid the issuance of rations. As the approrpiations for this early work were considered as gratuities from the Government to provide for the support of and civilization of the Indians, and as there was no thought that this money would have to be repaid, no records or, at best, only the most meager records, of the transactions were kept.

During the 20-year period following 1895, as the white settlements adjacent to many of the Indian reservations were growing to considerable proportions and as there was extensive activity in the construction of irrigation projects by private interests and by the Reclamation Service, the Indian Service, too, car-

ried on a rather extensive program of irrigation development, not always because there was a demand for additional irrigated land for the Indians, but because of the necessity for such development in order to initiate and to hold the water rights until such time as the water would be needed by the Indians or for their land. During this period of development many of the earlier small irrigation systems were either incorporated in the new or enlarged systems or entirely abandoned.

As the idea of reimbursement of irrigation construction charges had never been considered until the enactment of the law of August 1, 1914, and as reimbursement was not taken seriously even for several years after that, not much importance had been placed upon cost estimates. It is true apparently that for most of the work undertaken during this period, such estimates were made, but as was the case with the cost estimates of the Reclamation Service of about that time, they were usually but little more than guesses, and frequently very poor guesses, as irrigation work on a large scale was in its infancy and there was no background of experience on which to base estimates of cost.

Other factors that affected the Indian Service cost estimates of irrigation construction, and in frequent instances made them worthless as an index of the final cost of the work, were the inexperience of many of the engineers as a result of the inadequate compensation offered, inadequate supervision, absence of comprehensive plans, frequent changes in plans, etc., and particularly the fact that the work was done piecemeal—that is, spread out over a long period of years—which necessarily resulted in inefficiency and excessive overhead expense, all of which went to increase the final cost and would have made it practically impossible, in many cases, even for experienced engineers to have made reliable estimates.

Few, if any, of the Indian projects are yet completed, but extensions are being made from time to time, as and when funds can be secured.

The cost estimates for completing many of these projects are simply guesses, as in most instances there are no definite plans of what is contemplated, and in fact in frequent instances there have been no surveys or investigations upon which comprehensive plans could be based. In particular the estimated per acre cost, when completed, which is the matter of greatest concern to the farmer who eventually will have to pay, is for many of the projects wholly worthless as an index of what the final per acre cost will be as a result of the absence of determination of the irrigable area based on topographic and soil surveys, available water supply, necessity for drainage, and numerous other factors affecting the area of the completed project, and its feasibility.

Construction cost and collections.—The construction cost of all Indian irrigation projects as of June 30, 1927, is given as $27,901,444.75, of which $18,134,426.08 has been expended on the 17 projects covered by this report.

The total irrigable area now under constructed works for all projects is given as 692,057 acres. Dividing the total cost by the total acreage gives an average construction cost of approximately $40 per acre. This statement, however, conveys but little idea of the final cost per acre as a result of the uncertainty of both the water supply and the productive irrigable acreage on many of the projects. Until there is a more accurate determination of water supply and productive area, the actual per acre construction cost can not be very closely approximated.

Prior to the year 1914 there were, with respect to the funds used in their construction, two general classes of Indian irrigation projects: Those constructed from funds specified as reimbursable in the legislative act making the appropriation; and funds concerning which nothing was stipulated as to reimbursement, and hence considered as nonreimbursables or gratuities. Among those in the first class were the Crow, Blackfeet, Flathead, Fort Peck, Fort Belknap, Fort Hall, and Yakima. Where the funds expended for construction were reimbursable, repayments in most cases were to be made from tribal resourses.

The act of August 1, 1914 (38 Stat. 583), provided that:

"* * * all moneys expended heretofore or hereafter shall be reimbursable where the Indians have adequate funds to repay the Government, and that the Secretary of the Interior is hereby authorized and directed to apportion the cost of any irrigation project constructed for Indians and made reimbursable out of tribal funds of said Indians in accordance with the benefits received by each individual Indian so far as practicable from said irrigation project * * *."

Thus it was announced that the general appropriations theretofore made and up to that time apparently a gratuity, as well as those thereafter to be made, should be reimbursable from Indian funds, and further that the whole cost of

any project theretofore financed by appropriations from the Treasury and made reimbursable from tribal funds was to be apportioned to those individuals of the tribes whose lands were actually benefited.

For several years following the act of 1914 no steps were taken looking to an apportionment, the reason being that the costs could not be known until the irrigation systems were completed. In this situation, Congress, in the Indian appropriation act of February 14, 1920 (41 Stat. 408), provided that:

"The Secretary is hereby authorized and directed to require the owners of irrigable land under any irrigation system heretofore or hereafter constructed for the benefit of Indians and to which water for irrigation purposes can be delivered to begin partial reimbursement of the construction charges, where reimbursement is required by law, at such times and in such amounts as he may deem best; all payments hereunder to be credited on a per acre basis in favor of the land in behalf of which such payments shall have been made and to be deducted from the total per acre charge assessable against said land."

The decision as to the annual assessments to be made was left to the discretion of the Secretary of the Interior except on the Fort Hall and Wapato projects, where they had already been specifically fixed by special legislation.

With the exception of these two projects and the Flathead, Blackfeet, and Fort Peck in Montana, which were assessed at 50 cents per acre, assessments were made at the rate of 5 per cent of the per-acre construction cost as of June 30, 1920, and made due November 15, 1920, and each year thereafter until 1927, when the rate was reduced to 2½ per cent per annum. These assessments were made against all allotted or fee patented lands under constructed ditches on each project operated by the service.

During the past eight years $979,559.79 have been collected on all projects, or 3.5 per cent of the total construction cost to June 30, 1927. Owing to the fact that some nine millions of dollars have been expended on construction work during the past eight years, that assessments are not required to be made against land until irrigation facilities are available, and that allotments have not been made on many of the smaller projects, collections could not be made on all projects.

Following is a list of projects on which collections have been made. This list shows the total construction costs to June 30, 1927, the total assessments made, total collections, and percentages of total cost collected.

Project	Total construction cost	Total assessments	Total collections	Per cent of cost repaid
Colville, Washington	$20,177.33	$23,429.00	$12.50	
West Okanogan, Washington	95,000.00	34,250.00	3,989.16	0.042
Klamath, Oregon	219,994.23	42,213.65	6,157.20	.028
Ahtanum, Washington	94,114.12	4,865.90	833.60	.009
Wapato, Washington	3,291,318.00	764,728.55	737,098.59	.23
Fort Hall, Idaho	1,767,189.52	73,938.27	73,620.90	.35
Uintah, Utah	913,896.86	1,522.88	1,522.88	.0017
Blackfeet, Montana	1,094,653.89	74,008.93	14,412.73	.0131
Crow, Montana	1,978,934.99	450,357.27	4,789.46	.024
Flathead, Montana	5,177,715.32	312,684.41	74,788.90	.014
Fort Peck, Montana	803,876.82	56,760.64	5,904.98	.007
Wind River, Wyoming	1,451,429.72	168,957.29	12,802.01	.009
Colorado River, Colorado	506,831.30	137,349.00	14,341.06	.028
Yuma, Arizona	512,382.58		28,787.40	.056
Southern Ute, Colorado	206,911.40	66,478.95	498.42	.0024
	18,134,426.08	2,201,544.74	979,859.79	.054

The construction collections amount to 5.4 per cent of the total cost of the 16 projects where such collections were made. It will be seen, however, that the collections are approximately 45 per cent of the total amount assessed. It should be understood that assessments on many of the projects are levied against the Indian land as well as the white-owned land, and that the Indian has not been required to pay unless considered financially able.

However, when analyzing each project it is found that a considerable proportion of these construction costs can never be returned. On some projects Congress did not require the total costs to be repaid. Other projects, like Fort Peck and Blackfoot, are failures owing to the climatic, water, and soil conditions. On some of the projects, where prior to 1914 the expenditures were considered as

nonreimbursable, land passed from Indian into white ownership without contracts covering repayments, and the costs in such cases can not now be collected.

We are convinced that closer check should be kept in the Washington office on these assessments and collections. Control accounts should be posted from field reports. A firm policy of requiring payments to be made when due should be put into effect and carried out. We believe that an adequate organization in the Washington office properly directed will be enabled to materially increase the collections of construction assessments, at least from whites.

Owing to the fact that the Indians almost in all cases have been considered by the Indian Bureau to be financially unable to pay the construction assessments, these assessments are accrued against the Indians land. In cases where it becomes necessary to sell this land for the benefit of some aged or incompetent Indian the purchaser is required to pay these accrued assessments in cash at the date of sale. This makes the initial payment of the purchaser very heavy and reduces the sale price materially.

We advise that in sales of Indian lands having accrued irrigation construction charges against them, that the total construction charge due—both the accrued and unaccrued—be distributed over a term of years equal to the regularly established repayment period applicable to the project in which such lands are located, to be paid by the purchaser, and that if necessary, legislation be enacted to accomplish this purpose.

Due to the fact that but few of the Indian farmers are financially able to pay the construction assessments on their lands, we consider it advisable to defer these assessments in all cases where the collections can not be reasonably enforced.

Operation and maintenance costs and collections.—The total operation and maintenance costs to June 30, 1927, amounted to $8,827,143.10. These total costs, together with the repayments, are shown in the following table for each of the five Indian irrigation districts:

District	Operation and maintenance costs	Operation and maintenance collections	Per cent of cost collected
1	$1,390,113.47	$1,129,729.09	81.3
2	2,065,570.12	607,180.99	29.4
3	3,254,075.85	758,768.20	23.3
4	1,584,498.61	135,498.19	8.6
5	532,885.05	7,134.86	13.4
Total	8,827,143.10	2,638,311.33	29.9

At the time the Indian Bureau began the operation and maintenance of the first projects, the entire acreage was owned by Indians. The expenditures for this work were then considered as gratuitous, and in many instances were presumed to be in lieu of rations, as these projects enabled the Indian to produce a portion of the food necessary for his subsistence.

As the Indian irrigation projects were built, the Indian, if he farmed at all, was not disposed to farm more than was absolutely necessary to supply himself with such crops as he actually required for his own susbistence. In fact, on many projects this condition exists to-day. In consequence much of the land was not utilized by the Indians, and it was soon considered necessary, in order to initiate and to protect the water rights, to lease lands that the Indians were not using. To accomplish this, it was held necessary in many cases to relieve lessees of operation and maintenance charges, or to give them a substantial reduction from the actual cost to the Government.

On a number of the larger projects Congress required the repayment of operation and maintenance costs, but it was not until the act of August 1, 1914, was passed that the policy was generally adopted. This act left the matter of making assessments to the discretion of the Secretary of the Interior and the Indian Bureau apparently has not kept pace with changing conditions on the projects. On many projects, where allotted lands have passed into white ownership, these owners were not charged their proportionate share of the costs.

The total operation and maintenance collections to June 30, 1927, amount to $2 638,311.33, or 29.9 per cent of the cost to the same date.

The following table gives the costs and collections to June 30, 1927, for the projects under consideration:

Operation and maintenance costs and collections

Project or unit	Total costs to June 30, 1927	Total collections to June 30, 1927	Per cent collected
Wapato	$1,136,240.04	$1,045,611.99	92
Toppenish Simcoe	19,298.39	1,686.75	8.7
Satus	14,705.90	5,867.16	42
Ahtam	73,719.16	69,002.11	95
Colville	38,961.13	874.52	2.2
Klamath	69,249.09	6,686.56	9.6
Florence-Casa Grande (whole system)	117,628.86		
Colorado River	408,355.25	95,309.31	23.3
Southern Ute	92,450.70	4,725.23	5
Uintah	1,023,744.94	274,901.96	26.7
Fort Hall	814,761.05	332,279.03	40.5
Wind River	798,339.12	119,676.30	15
Blackfeet	256,380.17	59,769.52	23.3
Fort Peck	137,152.35	12,196.96	8.9
Flathead	774,855.56	316,404.95	40.8
Fort Belknap	241,928.42	1,479.35	.6
Crow	1,011,284.58	249,241.12	24.6
Walker River	64,808.94		
	7,293,863.65	2,595,712.82	37

It will be noted from the above, that with the exception of the units on the Yakima Reservation, none of the projects have collected half the amount of the costs. It was found that the rates established were, as a general rule, insufficient on many of the projects to return the costs. Lands are included within the acreage assessed that should not be classified as irrigable, and an owner never will, or never can pay the amount assessed against such lands. The management of the projects is anxious to keep the rates as low as possible, which is but natural, and for this reason have probably included lands as irrigable and productive which are not actually so. Your advisors can not too strongly urge the necessity of limiting all projects to an acreage that it is considered economically feasible to supply with water. Land should not be included within the irrigable area that from any cause, such as rough topography, seepage or alkali, or unproductive soil, etc., will not enable the average farmer to secure a reasonable return for his effort. Operation and maintenance rates should be fixed annually. The basis for fixing these charges should be the total estimated cost for the year for which the charge is fixed, and to this should be added any deficit accruing from the past year.

Interest or penalty rate.—There is no uniformity in the rate of penalty on overdue accounts. On various projects it has ranged from 5 to 12 per cent annually. It is recommended that a definite time be fixed for all annual charges to become due and thereafter that a penalty of one-half of 1 per cent a month or fraction thereof be charged on all delinquent construction and operation and maintenance accounts.

Extensions of time interfere with collections.—The Indian Office has on occasions granted concessions to certain interests that have interfered with collections and undermined the morale of both the water users and the project organizations. It must be realized that the officials responsible for collections will not be popular among the people from whom collections are made and that the field officials must have the unqualified support of the Indian Bureau. The concessions that may be given any water user on one project soon become known on other projects. On many projects complaints were made both by Indians and white farmers that the big landowners, or the lessees with a big acreage and political influence, often receive water whether they pay for it or not, while the owner or lessee with only a small land holding and little or no political influence is required to pay irrigation charges promptly or his water is cut off and his crops destroyed. The files of the Indian Office show that there is some justification for these complaints, as instanced by the case of the Campbell Farming Corporation, a lessee, on the Crow Reservation, who has frequently been granted extensions of a year or more at a time. The granting of extensions to such a large operator soon became

known on many projects and naturally causes much bitter criticism, and makes it difficult to make collections from the less-favored farmers.

Indian Bureau policy as to collections.—The organization and development of the Indian Bureau, of whose activities the Indian Irrigation Service is but a small part, has been largely along lines of endeavor that has stimulated little interest in the return or repayment of money expended. The bureau has been developed principally as an eleemosynary or spending organization and not primarily as a business agency concerned with the return of funds invested. Civilization, education, and welfare can not, it is true, be measured in collars. Yet Congress has decreed, whether rightly or wrongly, that much of the moneys spent for Indian irrigation must be returned.

At the time of the inception of many of these projects it was not the intent of Congress that the funds expended for construction would be reimbursable to the United States Treasury. There is a strong sentiment among many officials of the Indian Bureau that the money spent for Indian irrigation works should not be reimbursable. On several projects the statement was made by the Indians that prominent officials of the Indian Bureau, including the assistant commissioner had told him they would not be required to pay the irrigation charges that were accruing against their lands. The white purchaser of Indian allotments naturally assumed that the debt is against the land and that his land should pay no more than the land of his Indian neighbor. Under these circumstances efficient work in collecting the Government's money can not be expected. Those whose duties it has been to administer the law, have lacked a full appreciation of the intention of Congress that the expenditures be repaid. Leases of Indian lands have been made where no apparent thought was given to construction repayments. Sales of Indian farms including a water right have been made, where the appraised price was less than the cost of developing the water right, and sales have been made without attempting to protect the Government's investment in the construction of the irrigation system. It is no wonder that a bureau built up as a welfare organization through a long period of time and numbering among its employees many who have been in its service many years should be a poor collector. It must not be expected that collections will be enforced in the future unless the irrigation management and all the functions collateral to it are thoroughly separated from the other activities of the bureau.

Collections.—On June 13, 1925, Circular No. 1677a was issued to "all superintendents" reading in part as follows:

"On May 12, 1921, Circular 1677, resale of irrigable lands, was addressed to all superintendents. It was pointed out therein that the collection of irrigation construction charges was required by the terms of an act approved February 14, 1920 (41 Stat. 408), and that in addition to the construction charges there was an operation and maintenance charge assessable annually that must be paid by the landowers benefited; furthermore, that the purpose of this circular was to point out to the superintendents the necessity of advising prospective purchasers that irrigation charges must be paid and that a so-called paid-up water right was not conveyed with the land.

"It has recently been brought to the attention of the bureau that irrigation construction charges and operation and maintenance charges have accrued against irrigable allotments prior to the time of their being advertised for sale, and that the superintendents have failed to provide for payment of the accrued irrigation charges, with the result that no means are apparent for their collection. It is not quite clear how a misconception of this nature arose in the minds of the superintendents, as the purpose of said circular was to specifically avoid the accrual of irrigation charges, and for their payment as provided by law."

We have not been able to obtain any authentic information as to the Government's losses due to this misunderstanding or oversight on the part of superintendents who, after the receipt of the above circular letter of May 12, 1921, continued to sell Indian lands without making any provision for the payment of irrigation charges; and due to the oversight of the Indian Bureau by reason of which the bureau was four years in learning that the superintendents were failing to comply with instructions. It is difficult to conceive how any organization properly manned and equipped, and properly functioning, could have failed for a period of four years to learn that a matter of such importance was being neglected. The fact that it was overlooked is compelling evidence of the inadequacy of the organization.

On many projects the areas designated as the "acreage ultimately irrigable when project is completed" and the "acreage now irrigable from constructed works" are not based on such data that they can be termed "estimates" but are

largely matters of opinion and therefore probably fictitious to a considerable extent in some instances. These questionable areas are being used as the basis for computing cost estimates and construction and operation and maintenance assessments. When there areas are corrected and the nonirrigable land, the nonproductive land, and the land for which there is not a water supply eliminated from the project, the assessable acreage will be substantially reduced and the cost estimate and irrigation assessments correspondingly increased.

One of the most pressing needs on many of the Indian projects is a reasonably accurate determination of the productive irrigable acreage. It seems apparent that on some projects the acreages now reported as irrigable from constructed works have been very liberally estimated, if not intentionally falsified in an effort to justify increased appropriations.

Congressional appropriations are usually made to cover the operation and maintenance cost on Indian-owned land not leased, on which collections can not ordinarily be made. White owners and lessees are supposed to pay their proportionate per-acre cost of operation and maintenance, and also of construction. The assessments are based on the "irrigable acreage under constructed works." The effect, therefore, of raising or exaggerating this "irrigable acreage" is to reduce the irrigation assessments on the white-owned and leased land, and increase the total amount chargeable or assessed against Indian-owned land not leased in proportion to the excess in the irrigable acreage as reported, over the true or actual irrigable acreage. It seems apparent that a considerable part of the operation and maintenance deficits existing on some projects, in some instances running into the hundreds of thousands of dollars, have been brought about in this way.

On some of the projects it was found that little or no effort is being made to keep a record of the acreage of white-owned land, and of the Indian land leased. Under such circumstances it is not known how collections can be properly made.

RECOMMENDATIONS

It is recommended:

1. That at the earliest opportunity there be made for each project a reasonably accurate determination of the irrigable productive acreage on which irrigation charges may properly be assessed.
2. That assessments of irrigation charges be based on the acreage of productive land actually irrigable from the available water supply.
3. That operation and maintenance rates should be fixed annually and based on the total estimated cost for the years, increased by any deficit from the previous year.
4. That in future operation and maintenance assessments and collections be made in advance of the irrigation season to which they apply and that they be based on, made, and reported by the calendar year, instead of the fiscal year, as is being done in the case of some projects at this time.
5. That there be adopted by the Indian Bureau a system for making assessments and collections with some uniformity as to time due, period for which made, basis and method of computation, penalty for delinquency, etc., so as to obviate the present confusion respecting these matters.
6. That extensions of time in individual cases should not be made, but that any concessions made to one farmer should be granted to all. Any other policy causes bitter criticism and makes it impossible to make collections.
7. That a closer check should be kept in the Washington office on the assessments and collections made on the various projects.
8. That in order to properly make assessments and collections an accurate record of the ownership and status of project lands be kept for each project showing the acreage in white ownership, the acreage of Indian land leased, and the acreage of Indian land not leased.
9. That a firm policy of enforcing collections should be carried out and that legal action be taken with a view of making all collections now delinquent.
10. That in sales of Indian land having accrued charges against them, the total construction charge both accrued and unaccrued be distributed over a term of years equal to the regularly established repayment period applicable to the project where such lands are located and to be paid by the purchaser.
11. That assessments of construction cost on Indian-owned land not leased be deferred.

COST ACCOUNTING

The practice of the Indian irrigation service is to do the cost accounting for the various projects in the office of the supervising engineer. This method has been followed since its organization. The work done by the cost accountant in

the supervising engineer's office is from the data contained in the project monthly time books, vouchers for minor purchases, etc., which are sent in by the project clerk or timekeeper, and vouchers for major purchases made through the supervising engineer's office by the disbursing agent.

The result is that the project engineer, unless he keeps a fairly accurate record, knows but little of the cost of his work and its various features, and the status of his funds, appropriations, amount expended and available, etc., until he receives a copy of the monthly cost report prepared by the cost accountant in the supervising engineer's office, which he usually receives about the 15th to 30th of the month following. It is therefore necessary for a careful and efficient project engineer to duplicate the work of the cost accountant in the supervising engineer's office.

We believe that cost keeping should and must necessarily be done on projects and not in the supervising engineer's office. To keep these in the supervising engineer's office is useless duplication, therefore loss of time and money, which can and should be saved.

Such a system and method of cost keeping should be adopted as will place the project or field organization where it properly belongs, the burden of distributing the costs, as well as the control of field inventory accounts. Such a system has the advantage of affording the engineer or officer in charge of the work first-hand information promptly and at the time needed as to actual costs. The engineer can thus determine field costs daily with a chance of locating and eliminating factors of excessive costs.

The Bureau of Reclamation, profiting from its years of experience on works of all magnitude from the smallest to largest, and carrying out the suggestions of the fact finders for a reorganization, has proposed and adopted a comprehensive cost-account system, and as they have a complete set of forms which have been perfected after many years' use and frequent revisions as the need became apparent, it is believed this system should be adopted adn put in practice, and it is so recommended.

INCOMPLETE AND UNRELIABLE DATA IN JUSTIFICATION FOR APPROPRIATIONS

We are inclined to the belief that as a result of failure on the part of the Indian irrigation service to include complete and detailed information in justification for appropriations, Congress sometimes appropriates funds for irrigation activities without thorough understanding of the work contemplated.

As an instance, it is noted that in the hearings on the Indian bill for the fiscal year 1928 request was made for an appropriation of $520,000 for the construction of certain pumping units on the Wapato project of the Yakima Reservation; and the statement is made that the work contemplated will reclaim 20,000 acres of land adapted to fruit and potatoes, increasing the value of the land from $1.50 to $150 per acre by the expenditure of $26 per acre.

In the face of this, however, we learned in our study of this project that the actual estimated cost of the work proposed for reclaiming of the 20,000 acres is approximaterly $1,500,000; and that the plan now adopted and being carried out calls for an expenditure of $533,000, a little more than the amount appropriated, to reclaim 10,880 acres instead of 20,000 acres, as set up in the justification.

The discrepancy of nearly $1,000,000 in the cost of the project extension is explained by the statement that it is the intention to use construction collections from that part of the project already completed in order to make up the balance of the funds required for this development over and above the $520,000 which, as we understand it, Congress was informed the development would cost. The way in which the matter was presented in the congressional hearings is justified by the fact that onyl $520,000 was being requested as an advance from the Government, and in consequence it was considered unnecessary to bring out the fact that the development in contemplation and now being constructed is to cost about $1,500,000. It is possible that this is entirely proper, and that the extent of the development may have been fully understood by the congressional committee, as clained by Indian Bureau officials. However, the expenditure of such amounts of money and embarking on such extensive development programs without congressional sanction seems to us an act of doubtful propriety, even though the expenditure of construction collections is authorized by law.

The law giving authority to spend construction collections is the act approved February 14, 1920, reading in part as follows: "*And provided further*, That the Secretary of the Interior is hereby authorized and directed to collect on or before

December 31 of each calendar year hereafter, including 1920, from the white landowners under the said system the sum of $5 per acre for each acre of land to which water for irrigation purposes can be delivered from the said system, which sum shall be credited on a per-acre basis in favor of the land in behalf of which it shall have been paid and be deducted from the total per acre charge assessable against said land when the amount of such total charge can be determined; and the total amount so collected, including any money collected from Indian allottees, shall be available for expenditure under the direction of the Secretary of the Interior for continuing the construction work on the said system."

Under the act of April 4, 1910 (36 Stat., 270) it is provided that "Thereafter no new irrigation project on any Indian reservation allotments or lands shall be undertaken until it shall have been estimated for and a maximum limit of cost ascertained from surveys, plans, and reports submitted by the chief irrigation engineer in the Indian Service and approved by the Commissioner of Indian Affairs and the Secretary of the Interior, and such limit of cost shall in no case be exceeded without express authorization of Congress, and hereafter no new project to cost in the aggregate to exceed $35,000 shall be undertaken on any Indian reservation or allotment without specific authority of Congress, and the Secretary of the Interior shall transmit to Congress on the first Monday in December, 1910, a statement by systems or projects showing the original estimated cost, the present estimated cost, and the total amounts of all moneys, from whatever source derived, expended thereon for construction extension, repair or maintenance of each irrigation system or reclamation project on Indian reservations, allotments, or lands to and including June 30, 1910; and annually thereafter the Secretary of the Interior shall submit to Congress a cost account of all moneys from whatever source derived expended on each such irrigation project for the preceding fiscal year."

On January 22, 1913, the Secretary of the Interior transmitted to Congress a report in compliance with the act of August 24, 1912, covering the estimated cost of the Wapato project given as $5,149,595.28 for a project of 120,000 acres.

There had been expended to June 30, 1926	$3, 239, 998. 55
Payments for storage water to be made	1, 430. 000. 00
Total	4, 669, 998. 55

leaving a balance of $479,596.73 in the estimated cost over and above the funds expended or obligated. It would therefore seem that the estimated cost of $520,000 placed before Congress in 1926 would have exceeded the estimated cost of the project by more than $40,000. It may be considered that the action of Congress in passing the $185,000 in the appropriation act for the fiscal year 1928 was in effect consenting to a revision of the original estimate for a total further expenditure of $520,000 for the reclamation of 120,000 acres, but there is very serious doubt if such action of Congress can be considered an approval of a revised estimate of the expenditure of $520,000 for the reclamation of only 10,880 acres of the 20,000 acres when this specific proposition was not before them. It is the opinion of the advisers that a revised estimate of the completed project should be submitted to Congress in compliance with the law of April 4, 1910, before any part of the appropriation for the fiscal year 1928 is spent. It is, in our opinion, not good policy to permit the expenditure of construction repayments unless the same is appropriated by Congress, and we therefore believe the law of February 14, 1920, should be repealed.

Another instance of incomplete data that not infrequently characterizes the Indian irrigation service justifications is noted in the discussion of the Blackfeet project, appearing in the congressional subcommittee hearings on the Indian appropriation bill for the fiscal year 1929, wherein there is included some statements of a general nature and then instead of disclosing the conditions actually existing (that the Indians are making practically no use of the irrigation facilities provided by the Government project, having irrigated only 45 acres during the season of 1926), which apparently are purposely omitted, the statement is made: "Some of this land is irrigated by Indians and more will be." In the face of the fact that the acreage utilized by Indians has been rapidly decreasing for some years we can see no justification for the optimistic statement "more will be."

It is on such misinformation as this that Congress is expected to legislate and appropriate money for some of these irrigation enterprises. In the case of this project, the Blackfeet, of Montana, $45,000 has been appropriated for the fiscal year 1929. Assuming that as a result of misinformation in the justification the appropriation was made without a knowledge of the existing conditions, we are

recommending that no part of this appropriation be expended for permanent repairs or improvements until the congressional subcommittee shall have had an opportunity to consider the matter in the light of reliable information.

As more specifically pointed out in another section of this report much of the data relating to utilization of land, crop production, and other activities in the reports and justifications from some reservations is so grossly exaggerated as to be worse than useless. As instances of this, several thousand acres actually leased and farmed by Japanese on the Yakima Reservation are reported as being farmed by Indians On the Klamath Reservation the area reported as being farmed by Indians is many times the area they are actually farming. On another reservation a checking up of the area reported by the superintendent as farmed by Indians reduced the figures from approximately 10,000 acres to less than 8,000 acres.

Complete data specifically requested by Congress.—Complete data have been requested by the congressional committee on numerous occasions. In the hearings on the 1927 appropriation bill the chairman stated:

"It is necessary for the purposes in view to have the fullest information obtainable as to the exact financial status of each and every Indian irrigation project. It is necessary to have the acreage under constructed works, acreage for which sufficient water supply is available, acreage under irrigation, the ownership of the acreage on the project, ownership of the acreage under irrigated works, and the ownership of the acreage actually irrigated. As to the lands under irrigation we should know whether such lands are cultivated or whether they are used for pasturage or wild-hay crops and whether they are being used by the Indians, by white owners, or by lessees. We should also know the total construction cost, the date of completion, the amount of construction cost repaid by the Indians, by lessees, and by white landowners, and the same information with respect to the operation and maintenance costs of the project."

The law of August 1, 1914, specifically requests the data above referred to in reports to be made annually.

RECOMMENDATIONS

It is recommended that once annually in the future there be made, reported, and certified by the project engineer of each project a reasonably accurate crop survey showing on appropriate forms all the information heretofore specifically requested by the congressional subcommittee as indicated in the foregoing quotation from the hearings, and in addition thereto acreage, ownership, and status of land in project as contemplated, as Indian owned not leased, Indian owned and leased, and white owned; acreage, ownership, and status of project lands actually utilized; and acreage, average yields, and average returns of crops grown by Indians, by lessees, and by white owners

It is also recommended, as a means of securing a greater degree of accuracy in the data included in reports, that on frequent occasions irrigable acreage and crop surveys be made or checked by engineers or surveyors not connected with the Indian Bureau.

NECESSITY FOR ACCURATE AND RELIABLE DATA

Without reliable and trustworthy records and statistics of what has been accomplished it is impossible to determine whether results secured are satisfactory and what changes, if any, are desirable to promote better results Without accurate information those entrusted with the administration of activities and legislation respecting them are proceeding blindly Records are particularly essential respecting Government activities, especially in a Govenment such as ours, of, by, and for the people, as it is the right of everyone desiring it to have reliable information respecting the activities they are supporting, and this desire for knowledge should be encouraged There should be no desire to hide anything, but the people and their representatives in Congress should be given all the data necessary to a full understanding of the operations of the Government.

The necessity for such information increases with the magnitude and complexity of the work engaged in. Information should be available and available in such form that it can be readily utilized.

In the course of our work we have been greatly alarmed and concerned at the general tendency on the part of many Indian Bureau officials and employees in the preparation of reports designed for the purpose of showing the progress of the Indian or the success of the work of the Indian Bureau to be extremely, often unreasonably, optimistic. In some instances the distortion of actual con-

ditions is so great that it must be ascribed to downright exaggeration and deception.

It is our conclusion that in many instances this tendency toward overoptimism or exaggeration is the result, first, of that profound spirit of optimism concerning the Indian and his welfare with which many Indian Service employees are imbued and without which they could not successfully carry on their work; and, second, of a feeling or a realization on the part of many employees, apparently but unwittingly and unintentionally encouraged by the Indian Office, that tenure of employment, salaries, and promotions all depend upon whether each successive report shows an improvement in the conditions described in preceding reports. Thus the teacher feels it to his interest to report an increase in the interest of Indian children in their school work, the farmer is desirous of showing an increase in the farm operation of Indian farmers, the physician is anxious to show an improvement in health conditions.

On one reservation we were informed by two employees in responsible positions that the superintendent's admonition to certain of his employees charged with the preparation of the annual report was "The Indian Office expects a lot of hot air about the farming of the Indians and it's up to us to give it to them or they'll put employees in here who will give it to them."

On another reservation inquiry elicited the fact that no farm survey had been made for several years, and the reluctant admission was made that the data respecting the acreage cultivated and crops produced by the Indians, as included in reports, had for several years been arrived at by adding a "healthy increase" each year to the data for the preceding year. This method fails to take into consideration that frequently there may be a "healthy decrease."

On another reservation, when certain conditions not indicated in the reports were called to the attention of the superintendent, he stated that it was necessary for a superintendent to look on the bright side of the picture and be optimistic in his reports, and that if he failed to do this it usually meant a transfer to a less desirable location.

On another reservation the superintendent complained that his predecessor had so exaggerated his reports concerning the agricultural progress of the Indians that if he (the present superintendent) now reported conditions about as they actually are, it would show a very material backward movement or falling off in the activities of the Indians, and he would be criticized by the Indian Bureau for his failure to keep up the good work started by his predecessor.

We are compelled to regard much of the data put out to show the success of the Indians as being wholly unreliable. In the hearings before the subcommittee of the House on Appropriations for the fiscal year 1928 it was stated that the number of Indians farming on the Klamath project in the year 1926 was 50. We found only one Indian farming in 1927. The area farmed by Indians in 1926 was given in the hearings as being 2,080 acres. In our hearings on the ground it was given as 80 acres.

The number of Indians given as farming on the Wapato project for the past three years is given as 135 to 155. From our observations we are led to believe that this is overdrawn. It is known that in some instances Indian land is being farmed by Japanese under secret agreements between the Japanese and Indian, yet it is reported as farmed by the Indian. Most of the Indian farming observed upon that project is on the more undesirable lands that can not be leased.

INADEQUATE SALARIES AND THE MISSIONARY SPIRIT AND SOME OF THE RESULTS

The advisers share the conclusion frequently expressed by others who have studied the Indian Bureau and its work that the bureau is greatly hampered and is thus unnecessarily prolonging the work of civilizing the Indian and making him self-supporting by its falure to maintain a reasonably efficient and qualified corps of employees. The missionary spirit rather than the salary offered has been depended upon to secure and to keep employees in the service. Demands for increased pay have been frowned upon as indisputable evidence of lack of appreciation on the part of the employee of the soul satisfaction one should derive from having a part in the work of bringing civilization and enlightenment to the untutored Indian.

There can be no loyalty and efficiency in any business organization without reasonable compensation and proper recognition of services.

There is quite a noticeable contrast, on the average, in the loyalty and efficiency of the employees of the Bureau of Reclamation as compared with those of the Indian Bureau. Among many of the field employees of the Indian Bureau, par-

ticularly those of the agencies and schools rather than the irrigation service, there is, in many instances, an attitude of hopelessness, discontent, and general pessimism. These unsatisfactory conditions are the inevitable results of inadequate compensation, absence of reasonable expectation of promotion or advancement, absence of coordinated organization, isolation, and unsatisfactory living conditions. Resignations and transfers are frequent. It is reported by the Indian Bureau that for the fiscal year 1927 the average turnover for all permanent employees in the service was 67 per cent.

While conditions respecting employment are not as unsatisfactory in the Indian irrigation service as in the agency and school service, they are still far from satisfactory. Three of the supervising engineers, after 15 years in that position, are receiving $117 more annually than at the beginning of their service. It would indeed be a very exceptional employee who would retain his interest in his work and his efficiency after an experience of this kind.

It is not to be inferred from the foregoing that there are not many well qualified and efficient employees in the Indian Service. There are many who are as well qualified and as competent as could be found anywhere. In fact, it is a matter of surprise that the service numbers among its personnel so large a percentage of efficient employees as are actually found when the inadequate salaries and unsatisfactory conditions are considered.

From our observations and conversations with many employees, including superintendents, we conclude the Indian Service employees might be placed in three classes, as follows:

1. Young or middle aged who have been in the service only a comparatively short time, say one to three years, and who still retain their enthusiasm and interest, not yet having learned of the hopelessness of their situation as respects recognition and advancement in position and salary. These are efficient employees. They probably constitute about 15 to 25 per cent.

2. Middle-aged or elderly employees, who despite the fact that they have worked hard and diligently for 10 to 30 years or more with little or no recognition or advancement, still retain their interest and efficiency purely because of love of their work. These have the missionary spirit. They probably constitute about 20 to 30 per cent.

3. Middle-aged and elderly employees who largely as a result of failure to advance in position or salary after 5 to 30 years or more in service are hopeless and dissatisfied. They can not leave the service because they lack experience or are unfitted for anything else. They are the transferees. They are in a rut and in the slough of despair. They have lost the missionary spirit. They probably constitute about 45 to 65 per cent.

Some results of inadequate salaries.—Inadequate salaries and their inevitable concomitant, inefficiency, and incompetency are evidenced in the irrigation work on some of the reservations.

On one large irrigation system we find concrete structures, many of which are in our opinion unnecessary, many of them intricate and complicated in design, and some falling to pieces 8 to 15 years after construction. In some instances, control structures on small laterals, such as should ordinarily cost $75 to $150 each, were found actually to have cost in excess of $1,100 each. An explanation of this unbelievable extravagance was sought, but it remained a mystery until it was found on going into the history of this project, that at the time the construction was in progress and $100,000 or more was being expended annually (which would mean about $15,000 or $20,000 a month for the working season) the project was in charge of a junior engineer at a salary of $125 per month. It is the opinion of the advisers this young man is blameless. He probably did the best he could and, in all probability as well as any other $125-a-month man would have been expected to do. The responsibility for this waste of public money, in our opinion, rests with the organization—in this case the Indian Bureau—that will place work of such magnitude in charge of a young and inexperienced engineer primarily for the reason that he could be secured at a salary less than half that ordinarily required to secure a competent engineer. It is the opinion of the advisers, and we believe we are conservative, that more than $200,000 has been expended in building unnecessary and excessively expensive concrete structures on this project. However, possibly as much as $2,000 or more a year was saved in the salary of the engineer while the work was in progress.

On many reservations visited the advisers heard much complaint on the part of the Indians about the alleged incompetency and inefficiency of many Government employees resulting from the low salaries paid. This complaint is very general against doctors and farmers. It is complained on many reservations

that the doctors are so incompetent and inexperienced that the Indians have no confidence in them and in consequence are forced to patronize outside physicians in nearby towns; that the Indians would rather pay outside physicians or patronize their own medicine men than trust themselves to the Government doctor. It was stated that the doctor on one reservation had been there for a period of 14 years and had never attended a post graduate clinic or course of lectures or medical convention. Another reservation doctor stated that during 12 years' service he had had less than 12 days' leave of absence explaining that he could not secure a leave of absence unless he could employ a physician to look after his work during his absence and any physician available would demand as much for one month as the Government paid in three months. The impossibility of securing leave makes it impossible for doctors to attend conventions and clinics, and thereby keep up with their profession.

RESERVATION SUPERINTENDENTS SHOULD HAVE MORE AUTHORITY

In view of the generally high character, ability, fidelity, and good judgment of most of the reservation superintendents, it is believed that a mistake is being made in not delegating to them more authority and responsibility. It is seemingly apparent that they are being required to submit to the Washington office for action or approval many matters of minor detail of relatively no great importance, upon which they are better qualified to pass than anyone else. The correspondence necessary to properly present these questions to the bureau requires a considerable part of the time of the superintendent and his office force, and consideration, further correspondence, and action by the Indian Office takes up the time of the commissioner and his assistants. With the many important questions and problems continually arising that demand the most careful study and earnest thought of both the superintendents of the reservations and the Commissioner of Indian Affairs and their assistants, it would seem desirable to reduce to the minimum the minor details they are called upon to handle. An examination of the files of any agency will disclose much correspondence that has consumed time and stationery, worn out typewriters, and congested the mail, much of which could have been avoided by clothing the superintendents with more authority and responsibility.

Unnecessary correspondence.—The volume of correspondence emanating from the Indian agencies or superintendencies is almost inconceivable. The superintendents are given but little discretion and are required to refer practically every question to the Bureau of Indian Affairs for decision. The time and labor consumed by correspondence in overwhelming. This with the returns of property and pay-rolls, payments to individual Indians, advance estimates and justification and reading the hundreds of circular letters sent out by the Washington office each year, keep a superintendent tied down to his desk to the great detriment of his supervision of the Indians. In addition to the reduction of paper work there should be a bonded disbursing officer to relieve the superintendent of the time consuming labor and permit him to go about the reservation where his services are most needed.

It is reported that during the last fiscal year a total of 31,200 communications was sent from the Crow Agency. This amount of correspondence seems paralyzing. It would appear that some system should be devised to carry on business with less labor and effort.

SUPERINTENDENTS FREQUENTLY HANDICAPPED BY INADEQUATE AND INEFFICIENT OFFICE FORCE

In some cases, however, it is found that the superintendent is greatly handicapped by an inadequate force of employees, and in consequence is frequently under the necessity of doing work that should be done by someone else at a lower salary. There is certainly no economy in having a superintendent with a salary of $3,600 doing or attempting to do the work of a stenographer and file clerk who can ordinarily be employed for $1,800 a year, yet this condition is frequently found. The superintendent is without an adequate office force, and in an attempt to keep up the office work, he is trying to do the work of a stenographer, a clerk, or a general roustabout in the office, for which the Government is paying him a large salary. The Government in this way is losing money, but by far the greatest loss is to the Indians.

In one reservation we found the superintendent, apparently as the result of an inadequate or inefficient office force, attempting to do a large part of the office work. His desk was piled high with a confused conglomeration of correspondence

and papers. After he had spent some 20 minutes in a vain search for a letter he desired us to see, we suggested the advisability of a more satisfactory filing system consisting of the cabinets ordinarily used. He stated that he had these in the office, but that if he turned anything over to the clerks to file in the cabinets it required so much time and trouble ever to find it again, that he made it a rule to keep the important papers and correspondence on his desk.

So far as could be learned, there is no uniformity or system in filing and office methods in the various agencies or superintendencies, supervising enginers, and project offices. Each apparently uses some system of his own, and the time consumed or rather wasted in searching through the files for correspondence at some of the offices, if converted into dollars and cents, would be staggering.

It is believed that a saving running into many thousands of dollars annually could be effected by the Indian Bureau if a uniform method of office procedure and filing applicable to the field offices were adopted and placed in operation, with an expert to follow up, visiting each of the offices at intervals to see that the system was being maintained.

However, it is realized that the value of such a system is dependent largely on continuity of employment of the clerks, and with the frequent resignations and transfers in the clerical staffs resulting from the penurious salaries now paid the field clerks, it is impossible to expect any very great improvement.

INDIAN CLAIMS AGAINST THE GOVERNMENT

The principal cause of laziness and improvidence among many Indians are the claims that many tribes are urging against the Government for various real or alleged wrongs, principally the dispossession of lands. Followed to its ultimate conclusion, these claims, as urged by some Indians, would mean that the Government would pay the Indians now living for all of the territory embraced in the United States not what the land was originally worth to the Indians as a hunting ground but what it is worth to-day. On many reservations will be found a few Indians usually fairly well educated at Government expense claiming to be "leaders among my people," who are continually agitating these claims and encouraging the Indians to advance money to employ attorneys for the prosecution of these claims. Time that should be spent in work is thus wasted by many in chasing rainbows. These claims keep many Indians in a state of feverish expectancy which is fatal to their industry and peace of mind. It would seem advisable that a committee of able and nationally known attorneys should be appointed to investigate these claims and recommend whatever action seems equitable.

COMPILATION OF LEGISLATIVE ACTS

Beginning with the act of March 1, 1867, which made provision for the Government's entry into the business of irrigation development as a means of civilizing the Indian and enabling him to become self-supporting through agriculture, there have been many legislative enactments relating to Indian irrigation placed upon the statute books. An attempt has been made to bring the more important of these together in this report under the various projects affected.

It is believed that the legislative enactments pertaining to Indian irrigation should be compiled, arranged, indexed, and abstracted or digested for easy reference and that this compilation shouuld be kept up to date for the benefit of the officials of the Indian Bureau and others interested, and it is so recommended.

INDIAN OFFICE REGULATIONS

A general and widespread complaint exists among the various field jurisdictions that the business of the Indian Bureau is complicated, confused, and frequently needlessly delayed as a result of the fact that there are no understandable rules and regulations. The so-called regulations are practically obsolete and the regulations now in effect consist of a large number of circular letters to which additional ones are constantly being added. In many instances, it is stated there may be as many as a dozen or more circular letters relating to one subject, each succeeding one countermanding or amending to a greater or lesser extent one or more of the preceding circular letters. As a result the question as to just what the regulations are in a certain case is a fruitful source of argument and confusion among the employees of many of the schools and agencies. Some of the superintendents estimate that the time lost in needless correspondence, which would be obviated by having the regulations revised to date and in a form so

that they are readily available and understood, aggregates as much as 10 per cent of the time consumed in office work.

It would seem that the regulations should be completely revised and brought up to date and made to conform to present day methods of business in so far as possible, and published and distributed among those officials and employees in responsible positions. As it is now, the regulations are a riddle about which few of the employees know anything at all.

RULES AND REGULATIONS FOR IRRIGATION PROJECT OPERATION AND MAINTENANCE

The Indian irrigation service has never formulated rules and regulations for the guidance of those in charge of irrigation projects. In consequence, each of the supervising engineers or project engineers is left to his own resources with the result that each one formulates his own regulations. In most cases these are not reduced to writing. As a result, there is no uniformity in operation and maintenance methods and procedure throughout the service.

It is recommended that the Indian irrigation service prepare a manual including complete rules and regulations for the operation and maintenance of the various irrigation projects.

WINTER EMPLOYMENT OF DITCH RIDERS

On many of the northern projects there is bitter complaint, both on the part of Indians and of white landowners, concerning the employment of ditch riders throughout the long winter season when there is but little work that they can do advantageously. On a few of the projects the practice has been followed of dispensing with the services of the ditch riders during the winter season and thus affecting a considerable saving. Answering the question as to the success of this plan, one of the project engineers, where the plan is in operation, stated as follows:

"We are all of the opinion that our present plan is the most satisfactory; that is, of paying only the labor scale during the winter months and only for such days as the ditch riders can work to advantage. Unless there is sufficient work that can be handled advantageously during the winter months, it is not a good plan to pay the riders an annual salary as it has a tendency to make the man somewhat indolent and dilatory during the wintertime, particularly if he feels that employment is only for the purpose of keeping him occupied and probably the work that he is doing is unnecessary. Full-time employment, particularly where it comes under the observation of landowners, subjects us to considerable criticism."

In further consideration of this matter, attention is called to the fact that on the projects of the Bureau of Reclamation ditch riders are employed only for the irrigation season. Information supplied by the Bureau of Reclamation shows that on the Boise, King Hill, Minidoka projects of Idaho, ditch riders are employed for six months during the year. On the Huntley, Milk River, and Sun River, Lower Yellowstone and North Platte projects they are employed for five months.

SOME PROJECTS ON THE BORDERLAND BETWEEN ARIDITY AND HUMIDITY

Making an agricultural country out of a grazing country—hopelessness of the situation from the Indians' standpoint.—Some of the Indian irrigation projects in Montana and Wyoming are almost hopeless from an economic standpoint. They are on the borderland between aridity and humidity; the necessity for irrigation and the ability to farm without it. Some years, there is sufficient rainfall to produce satisfactory, even good, crops without irrigation. Some years, most years, the rainfall is not sufficient, and irrigation is needed. Some years, the weather is such that crops are a failure, even with irrigation. In much of the area, dry farming can be successfully carried on, and we are sometimes confronted with the complaint that the irrigation works never should have been built; that it is a dry farm country; that irrigation is not needed; and that the cost of irrigation construction and operation and maintenance is so out of proportion to the small and sometimes questionable benefits derived, that it places such a burden on the land as to make it impossible ever to pay for it from the land itself. In fact, in some instances, farmers are not using water, but are dry farming. Naturally they object to paying for water when they claim it is not needed and they do not use it.

The truth is, this is not an agricultural country. It is primarily a grazing country, and the most perfect irrigation systems it would be possible to build

were the United States Treasury opened up for the purpose will never make of it anything other than a grazing or dry farm country.

The whites—lessees and landowners—on these projects, in the main are not successful. On neighboring corporate and Government projects, the average farmer is unable to meet his construction and operation and maintenance payments and is asking for relief—for moratoriums, extensions, etc. How can it be supposed that the Indians, but one generation removed from savagery or barbarism, without capital, without tools and equipment, without previous training and experience in intensive farming necessary under irrigation, without ambition, often lacking in energy and industry, with centuries of ancestral primitive life calling him to more appealing pursuits, etc., can make a success of it. As well expect a child to successfully manage a great railroad or other corporation.

CONVEYANCE OF STORED WATER IN NATURAL STREAMS

Construction of storage reservoirs, and conveyance of stored water down natural stream channels, along which streams prior or natural flow water users have their diversion headings, etc., frequently creates a great hardship on those natural flow water users, in that it is present practice, said to be sanctioned by laws in many States, that these normal flow users are compelled to maintain their own diversions so as not to interfere with the conveyance of stored water. As a result, they are frequently under the necessity of replacing their diversion dams and headgates with stronger and more expensive and larger ones, the old ones being too small to too weak to withstand the increased pressures and flow of water, etc. It is believed in such cases the agency or project conveying water should assist in maintaining and replacing diversions of early users.

NATURE AND CONTENT OF COMPLAINTS COMMON TO MANY PROJECTS

On all reservations or projects where there was manifested a desire on the part of farmers—either Indian or non-Indian—for a public meeting for a discussion of their problems and complaints, or where it was thought advisable and profitable by the advisors to hold public meetings, such meetings were held. Usually separate meetings were held for each race; but in a few instances, meetings would be attended by both Indians and non-Indians.

In general, on the northern reservations, meetings were held with the Indian Tribal Council. On some reservations, particularly the Blackfeet, Fort Peck, Fort Belknap, Crow, Wind River, Tongue River, and Uintah, there are among the members of these tribal councils, some very able men, who in a discussion of their various tribal and economic problems display a breadth of knowledge concerning agreements, treaties, laws, and appropriations applicable to their reservations, that is really remarkable, and some of them, particularly the most northern reservations, are gifted in the art of expression.

In addition to these public meetings, numerous conferences and interviews were had with individual farmers and business men, the Indian reservation and project officials and employees, and with local and county officials.

In many instances, in addition to the presentation of their problems in public meetings, some of the Indian tribes or councils subsequently submitted written statements to the advisors, and in the few cases where, for one reason or another, no public meetings were held, the Indians submitted written statements.

In addition to the foregoing sources of information, the reservation superintendent and the project manager or engineer were requested, in questionnaries, to include information concerning complaints.

It was very noticeable that the Indians on the southwestern reservations, where they are farming and making use of their land to a much greater extent than elsewhere, had few if any complaints and but little or no desire for meetings or conferences, apparently being too busy with their farm work, while on the northern reservations public meetings are much more popular and complaints much more numerous.

It was observed also, as might be expected, that on these reservations or projects where the people, either Indian or non-Indian, have as the result of some fortuitous circumstance or condition been the recipients of any special concessions or advantages, there are infinitely more complaints than on those reservations less favored.

As all who have had any practical experience with irrigation enterprises know on every irrigation project there are many farmers more or less dissatisfied and who feel that they are being unfairly treated. We were not surprised therefore, to have presented to us a great number of complaints and suggestions

so numerous that it would not be profitable to set them all out in detail. While efforts were made to have the complainants limit or restrict their complaints to those relating to irrigation, and also to matters that affected the project as a whole, or at least a number of farmers rather than individuals only, we were not always successful, especially with the Indians, so that many complaints of little or no importance were frequently brought to our attention.

In a general way the more insistent criticisms concerning irrigation matters that are more or less common to all the reservations may be classified and stated as follows:

1. That the project management feels so secure in its position that it has become arbitrary and often acts in vital matters without reference to the rights of the people.

2. That the project management is uneconomical and wasteful in the conduct of the work; that ditch riders are employed during the entire year, even though the irrigation season may be but four or five months or less; and that employees frequently fail to work the 8-hour day required of them, by driving long distances to and from their work on Government time.

3. The universal complaint more or less insistent on the part of non-Indians on every project is "Taxation without representation." They bewail the fact that they are required to pay irrigation charges but have no voice in the management of the work.

4. That there are no public schools, or if there are such schools, those are attended by Indian children who are often affected with contagious diseases, especially trachoma or tuberculosis, and that conseuqently it is unsafe for the non-Indian families to send their children to school.

5. That there are few or no improved roads or public improvements on many of the reservations and projects, therefore making it difficult or impossible for lessees and non-Indian owners to market their crops.

6. That Indian farmers are careless in irrigating, and frequently flood the roads.

7. Non-Indians (lessees and landowners) on some reservations complain they are treated as foreigners, without rights, by the superintendent and the project officials, and that the Indians are always favored when disputes or controversies arise.

8. The Indians on many reservations complain that the whites are favored to the disadvantage of the Indians; that the whites receive the best water service because they pay for water, and that the Indian, because he does not pay, is neglected.

9. The Indians complain that the farmers employed by the Government to teach them to farm are incompetent, or that they spend all their time working for the superintendent.

10. Many Indians profess to believe that the irrigation systems were built as a scheme to dispossess them of their lands, by assessing irrigation charges which in a few years will exceed the value of the land.

11. A very general complaint among all farmers, both red and white, and one that is justified in many cases, is that many projects have been extended over more land than there is water to serve.

12. Whites complain that Indian stock is allowed to run at large, frequently destroying their crops. This complaint is usually justified.

13. White landowners and lessees frequently complain that Indians fence up the roads, so that they have no means of access to their land.

14. Both Indians and whites frequently complain they are assessed irrigation charges on nonirrigable land. In many instances this is true. In other instances all irrigable lands are not being assessed.

All of these complaints, it is believed, are covered in one or more of the various sections of this report.

Irrigation on Fort Belknap Reservation, Mont.

1. RECOMMENDATIONS

The advisers respectfully recommend:

1. That the leasing of the idle irrigable lands under the Milk River Canal unit shall conform to a general leasing system recommended in another part of this report, in order (1) to safeguard the water right, and (2) so that it may contribute to the irrigation charges.

2. That no land shall be leased upon a basis of growing wild hay, and that the Indians shall be encouraged as rapidly as possible to get their allotments into some crop that is more productive than wild hay.

3. That no further construction or operation and maintenance work involving the expenditure of Government funds be performed on any of the units of this reservation, other than the Milk River Canal unit.

4. That the farmers living on the units other than the Milk River Canal unit be required to operate and maintain these units, doing the necessary work under the direction of the superintendent or agency farmer, who should be authorized to compel the farmers receiving water to contribute work in proportion to the benefits received.

5. That a well qualified and experienced man of the type and having the education and qualifications of the men usually employed in agricultural communities as county agents be employed to instruct the Indians in agriculture and to assist them in becoming farmers.

6. That a substantial reduction be made in the number of irrigation employees on this reservation, and that ditch riders be employed for the irrigation season only.

7. That no further construction funds be expended upon the Milk River Canal unit until the lands now susceptible of irrigation shall be brought under cultivation.

8. That the Milk River Canal unit shall be operated and maintained by the same agency as the other large Indian projects, because there is still some uncompleted construction and several important structures to maintain.

9. That the operation and maintenance costs and charges under the Milk River Canal unit shall be based upon an area of 10,000 acres, until a definite area as indicated below is determined.

10. That all private land holdings under the Milk River Canal unit shall pay a construction charge of 2½ per cent on the cost based upon 10,000 acres until such time as a definite irrigible area is established by a soil survey and land classification; provided further, that construction costs on Indian lands shall be governed as provided under the general recommendations.

11. In view of the fact that there is a grave question as to the adequacy of the water supply for all units other than the Milk River Canal unit, it being claimed by many that the water supply is even inadequate for the area now irrigated, it is recommended that pending a careful determination as to the question of water supply, all irrigation construction and operation and maintenance costs now assessed against and carried as a lien against lands not irrigated, be suspended; and that the lands irrigated shall not be assessed with any part of the cost of extending the irrigation system over lands for which there is not an adequate water supply.

2. SYNOPSIS

The Fort Belknap Reservation was established by act of Congress of May 1, 1888, ratifying the agreement of January 21, 1887.

This reservation is in north central Montana in the Milk River Valley. It is rectangular in outline, extending southward about 40 miles from Milk River—its northern boundary—to the Little Rocky Mountains. Its average width is about 25 miles. The area is 622,917 acres. In the northern part, along Milk River, there is a tract of about 17,800 acres of level bottom land, and in the extreme southern part there are a few isolated tracts of agricultural land. With these exceptions, the reservation is fit only for grazing purposes.

Transportation and markets.—The Great Northern Railroad is just north of the reservation. The Indian agency is 4 miles south of Harlem (population 700), a town on the railroad, and the towns of Malta (1,400) and Chinock (1,200), the latter having a sugar factory, are near. The Roosevelt Highway passes through the northern part of the reservation. The agricultural land in the northern part of the reservation is within 4 to 10 miles of railroad shipping points. That in the south is from 40 to 60 miles from the railroad.

Allotments.—All irrigable, dry-farm, and grazing land was allotted 1922–1924. Each Indian then living received an equal share as to value of the lands allotted. Allotments are held under trust patents. No fee patents have been issued, and therefore no land has passed into white ownership.

The following allotments were made and approved:

605 irrigable allotments of 160 acres each.

96 dry-farm allotments of 160 acres each.

1,181 grazing allotments of 320 acres each.

Population and Indian health.—The Indians are of two tribes: The Assinniboine, numbering 581, and the Gros Ventre, 621; or a total Indian population of 1,202, of whom 705 are full bloods. There are 393 families, all living in permanent

homes. There are 841 cases of tuberculosis, and 420 of trachoma. The white population is 100.

Climate.—Range in altitude, 2,300 to 3,000. Maximum temperature, 102°; minimum, 57° below zero. The average length of growing season is 128 days.

Soil and drainage.—There has been no soil survey. About 75 per cent of Milk River Valley is fine sand-clay silt, and the remainder is gumbo. Occassional areas contain alkali. The native vegetation of bottom land is blue-joint grass; of the uplands, grass and sage. No drainage has been provided. The entire area will probably require drainage in the future if irrigation is continued.

Water supply and water rights.—By the terms of the well-known Winters' Decision of the United States Supreme Court in the case of Winters *v.* United States (148 Fed. 684–1906), there is decreed to the Indians of this reservation a right of first priority to 5,000 miners inches of the waters of Milk River. With careful use this should be sufficient for the area ultimately to be served by the Milk River Canal—aproximately 11,000 acres.

It is proposed eventually to supply 6,700 acres in the Milk River Valley unit, but above the Milk River Canal, with water from three small creeks; 2,700 acres of this is now under canal. There is some doubt as to whether the supply is sufficient for any more than the 2,200 acres now being irrigated.

The Mountain units in the southern part of the reservation are watered from several creeks. The aggregate irrigable area is given as about 7,400 acres, but in the opinion of the advisers, there is serious doubt as to whether the water supply is sufficient for more than the area now being irrigated—approximately 3,300 acres.

General plan of irrigation development.—Irrigation on this reservation is restricted by natural conditions to two widely separated localities: A tract of level bottom land along Milk River in the northern part; and a few small areas among the mountains in the southern part of the reservations.

The most important feature of the irrigation development is the Milk River Canal, which is diverted from the river by means of a rock-filled wooden-crib weir, about 4 miles south of Harlem, and near the Indian agency and school. The canal is 18 miles long and will, when the lateral system is completed as proposed, serve 11,100 acres. It now serves 9,000 acres, of which 6,530 acres are irrigated.

That part of the Milk River unit above the Milk River Canal, 6,700 acres, receives its water supply from three small creeks; 2,700 acres of this is now provided with irrigation facilities, of which 2,200 acres are irrigated.

The mountain units in the southern part of the reservation are small, widely separated areas. They are 40 to 60 miles from railroad or markets. The aggregate area is given as approximately 7,400 acres, of which about 5,200 acres are now provided with irrigation facilities, and about 3,300 acres are reported as being irrigated.

Summary of project works.—There are 149 miles of canals and laterals, 19 miles having a capacity of 100 second-feet. There are three storage reservoirs with capacities of 1,480, 1,440, and 400 acre-feet each, respectively; total capacity, 3,320 acre-feet.

Utilization of land.—During the season 1926 out of an area of 16,975 acres provided with irrigation facilities 12,123 acres were irrigated and 2,512 acres, or 15 per cent were cultivated.

One hundred and thirty-nine Indian farmers irrigated 9,699 acres, of which 1,805 acres, or 19 per cent, were in cultivated crops and 8,427 acres were in uncultivated crops. The uncultivated acreage consisted of 7,894 acres of wild hay and 533 acres of alfalfa. Indian farmers cultivated an average of 13 acres each.

Eighteen lessees irrigated 2,281 acres, of which 707 acres, or 31 per cent, were in cultivated crops. Lessees cultivated an average of 39 acres each.

Principal crops, yields, and returns.—The principal crops grown by Indians (1926) were: 743 acres wheat, average yield 13.4 bushels, average return $16.08 per acre; 533 acres alfalfa, average yield 2.2 tons, average acre return $17.68; 288 acres oats, averaging 14 bushels, average acre return $11.20; 4 acres potatoes, averaging 120 hundredweight acre return $239. The total estimated value of Indian crops was $54,918, of which $25,528 was from wild hay, with an acre return of $3.23. The average acre return from all crops irrigated by Indians was $5.66, and the average farm income per family was $395.

The principal crops grown by lessees were 486 acres flax, average acre return $16.20; 143 acres oats, average yield 15.5 bushels, average acre return $12.38; 113 acres wheat, average yield 12 bushels, average acre return $14.40. The average acre crop return on leased land was $10.70.

The low yields are due to poor farming and absence of humus in the soil.

Construction cost.—To June 30, 1927, the total expenditure for irrigation construction was $356,895.65.

Should the development be completed as planned and estimated for by the Indian irrigation service, requiring an estimated additional expenditure of $322,000 for the estimated irrigable area of 25,285 acres, the acre cost would be about $27. As previously indicated, however, the advisers believe that this estimated ultimate irrigable area and even the area over which canals have already been extended is considerably in excess of the area for which there is an adequate water supply. Prorating the total construction cost to the area for which it seems the water supply is sufficient, that is 10,000 acres under the Milk River Canal, 2,200 acres in the Milk River Valley, but above the Milk River Canal, and 3,300 acres in the mountain units, total 15,500 acres, gives an approximate expenditure of about $23 per acre to date.

Obviously the construction and the operation and maintenance cost per acre can not be definitely determined until the area benefited is definitely fixed, which will require a survey to determine the productive area for which there is a sufficient water supply.

The construction cost for the Milk River unit is given as $204,769.22, or approximately $20 per acre for the area for which the water supply seems adequate. Adding drainage, which will be necessary, would probably increase this to $35 or $40 per acre.

Collection of construction cost.—Of the money expended for construction to June 30, 1927, $9,969.96 is Indian tribal money and $346,925.70 is from the United States Treasury and is reimbursable.

No collections have been made, as it is held by the Indian Bureau that neither Indians nor lessees are able to pay.

Operation and maintenance cost.—To June 30, 1927, the operation and maintenance cost was $241,928.42, or about $14.30 per acre, for the area under constructed works.

The cost of operation and maintenance for 1926 was $15,262.95.

Collection of operation and maintenance cost.—Collections are not made from Indians for the reason, as given, they are unable to pay. Collections are made from lessees, the annual acre assessment being computed by dividing the total cost by the area under constructed works. For 1926 the per-acre assessment was $15,262.93 for 16,975 acres, or 90 cents per acre.

The total assessments on leased land to June 30, 1927, were $3,049.05, of which $1,479.35 had been collected. A penalty of 7 per cent per annum is charged on delinquent accounts.

Government investment.—The total investment in irrigation construction and operation and maintenance to June 30, 1927, less collections, was $597,344.72.

Probable returns on investment.—The act of April 4, 1910, makes all moneys therein and theretofore appropriated reimbursable "from Indian funds applicable for such purpose." Act of March 3, 1911, provides that "the proportionate cost of the project" * * * "shall become a first lien" on the land benefited, the fact of such lien and the amount to be recited in each fee patent issued, the lien to be unenforceable as long as the original allottee or his heirs "shall actually occupy the allotment as a homestead."

The Government's total investment June 30, 1927, was $597,344.72; $365,598.66 has been expended on the Milk River unit. It is believed by the advisers that there is a possibility of collecting a substantial part of the cost of the Milk River unit, providing that (1) It is possible to lease all land not being cultivated by Indians to good farmers and thus bring it under cultivation at an early date, (2) the repayment period be extended to 40 years, (3) this unit be completed and properly operated and maintained.

It is the opinion of the advisers that there is no possibility of ever collecting the funds expended for irrigation on this reservation on land other than that irrigable from the Milk River Canal. The total of these expenditures for irrigation exclusive of the Milk River Canal unit as given us by the Indian Office is $231,846.06.

3. DIGEST OF LEGISLATION, TREATIES, AND EXECUTIVE ORDERS

Legislation.—Act of June 10, 1896 (29 Stat. L. 351): Fort Belknap agreement * * * Such sums, or so much thereof as may be necessary, in any one year, shall be expended * * * in assisting the Indians to build and keep in repair their houses, inclose and irrigate their farms, and in such other ways as may best promote their civilization and improvement.

Act of April 30, 1908 (35 Stat. L. 83): For completion and extension of the Milk River irrigation system on the Fort Belknap Reservation in Montana, $25,000.

Act of March 3, 1909 (35 Stat. L. 795): For completion and extension of the Milk River irrigation system on the Fort Belknap Reservation in Montana, $25,000, reimbursable.

Act of April 4, 1910 (36 Stat. L. 277): For the Milk River irrigation system on the Fort Belknap Reservation in Montana, $25,000: *Provided*, That the amount hereby appropriated and all moneys appropriated in the acts of May 30, 1908, and March 3, 1909, shall be repaid into the Treasury of the United States from Indian funds applicable for such purpose.

Act of March 3, 1911 (36 Stat. L. 1066): For the Milk River irrigation system on the Fort Belknap Reservation in Montana, $15,000: *Provided*, That the portion of the cost of this project paid from public funds shall be repaid into the Treasury of the United States as and when funds may be available therefor: *Provided further*, That in the event any allottee shall receive a patent in fee to an allotment of land irrigated under this project, before the United States shall have been wholly reimbursed as herein provided, then the proportionate cost of the project, to be apportioned equitably by the Secretary of the Interior, shall become a first lien on such allotment, and the fact of such lien shall be recited on the face of each patent in fee issued and the amount of the lien set forth thereon, which said lien, however, shall not be enforced so long as the original allottee or his heirs shall actually occupy the allotment as a homestead, and the receipt of the Secretary of the Interior, or of the officer, agent, or employee duly authorized by him for that purpose, for the payment of the amount assessed against any allotment as herein provided shall, when duly recorded by the recorder of deeds in the county wherein the land is located, operate as a satisfaction of such lien.

Act of August 24, 1912 (37 Stat. L. 526): For extending the construction and maintaining the Milk River irrigation system on the Fort Belknap Reservation in Montana, $15,000, reimbursable in accordance with the provisions of the act of April 4, 1910.

Act of August 26, 1912 (37 Stat. L. 621): For irrigation system, Milk River, Fort Belknap Reservation, Mont. (reimbursable), $22.45.

Act of June 30, 1913 (36 Stat. L. 90): For extending the construction and maintaining the Milk River irrigation system on the Fort Belknap Reservation in Montana, $15,000, reimbursable in accordance with the provisions of the act of April 4, 1910.

Act of August 1, 1914 (38 Stat. L. 593): For maintenance and operation, including repairs, of the Milk River irrigation system on the Fort Belknap Reservation in Montana, $20,000, reimbursable in accordance with the provisions of the act of April 4, 1910.

Joint resolution March 4, 1915 (38 Stat. 1228), reenacted the item of August 1, 1914, for the fiscal year 1916.

Act of May 18, 1916 (39 Stat. 139): For maintenance and operation, including repairs of the irrigation systems on the Fort Belknap Reservation in Montana, $20,000, reimbursable in accordance with the provisions of the act of April 4, 1910.

Acts of March 2, 1917 (39 Stat. L. 980); May 25, 1918 (40 Stat. 573); and June 30, 1919 (41 Stat. 16): Each respectively provided for maintenance and operation, including repairs of the irrigation systems on the Fort Belknap Reservation in Montana, $30,000, reimbursable in accordance with the provisions of the act of April 4, 1910.

Act of February 14, 1920 (41 Stat. L. 408): For mainteannce and operation, including repairs, of the irrigation systems on the Fort Belknap Reservation in Montana, $50,000, for the fiscal year 1921.

Act of March 3, 1921 (41 Stat. 1225): For maintanance and operation, including repairs, of the irrigation systems on the Fort Belknap Reservation in Montana, $30,000 for the fiscal year 1922.

Act of May 24, 1922 (42 Stat. 559): For maintenance and operation, including repairs of the irrigation systems on the Fort Belknap Reservation, in Montana, $25,000, for the fiscal year 1923.

Act of January 24, 1923 (42 Stat. 1174): For maintenance and operation, including repairs of the irrigation systems on the Fort Belknap Reservation, in Montana, $30,000, for the fiscal year 1924.

Act of June 5, 1924 (43 Stat. 390): For maintenance and operation, including repairs of the irrigation systems on the Fort Belknap Reservation, in Montana, $30,000, for the fiscal year 1925.

Act of March 3, 1925 (43 Stat. 1146): For maintenance and operation, including repairs of the irrigation systems on the Fort Belknap Reservation, in Montana, $25,000, for the fiscal year 1926.

Act of May 10, 1926 (44 Stat. 458): For maintenance and operation, including repairs of the irrigation systems on the Fort Belknap Reservation, in Montana, $20,000, for the fiscal year 1927.

Act of January 12, 1927 (44 Stat. 934): For maintenance and operation, including repairs, on the Fort Belknap Reservation, in Montana, $18,000, for the fiscal year 1928.

4. HISTORY

The Fort Belknap Indian Reservation was established by act of Congress of May 1, 1888, ratifying a previous agreement made with the Indians on January 21, 1887. Under the terms of this agreement the Indians accepted the present Fort Belknap Reservation in lieu of a part of a much larger reservation, including all that part of Montana north of the Missouri and Sun Rivers and east of the Rocky Mountains, which was established by Executive order of July 5, 1873, for various Indian Tribes, including the Indians then receiving rations at Fort Peck, Fort Belknap, and Fort Browning.

The Fort Belknap Reservation is in north central Montana in the Milk River Valley. In shape or outline it is rectangular, extending southward approximately 40 miles from Milk River, its northern boundary, to the Little Rocky Mountains. The average width is about 25 miles and the area is 622,917 acres.

Irrigation was first attempted on this reservation in 1893 when a small ditch was built in the Milk River Valley near the Indian Agency. As the water surface in the river here is approximately 20 feet below the general level of the bottom land, water was first supplied to this ditch by means of an inclined chute on which a barrel was hoisted by a man-operated windlass. A small garden was irrigated by this crude method during the season of 1893. In 1894 horsepower was substituted for manpower and a larger area irrigated. In 1895 a further improvement was made by substituting a windmill which operated a small pump. Later a horse treadmill was substituted for the windmill. In 1896 an 8-inch centrifugal pump operated by a steam engine was used for irrigation and also for supplying domestic water for the Indian agency and school.

The first work of importance with a view to irrigation development on this reservation was in 1894, when preliminary surveys were made for determining the possibilities. The first work of any magnitude was began in 1898 on the Milk River Canal on the irrigation system known as the Big Warm Springs unit. Construction work was continued on various units from 1898 to 1902 and again in 1908, when the Milk River Valley system was repaired and extended.

5. LOCATION, TRANSPORTATION, AND MARKETS

State: Montana.
Counties: Blaine and Phillips.
Townships: 25–32 north.
Ranges: 22–25 east.
Railroad: Great Northern.
Highways and roads: Roosevelt Highway, 24 miles graveled; Dodson-Malta-Zortman, graded 50 miles; trails, unimproved, 200 miles.
Cities and towns: Harlem, population, 721; Dodson, 365; Chinook, 1,217; Malta, 1,427.
Railway stations: Harlem, Savoy, Coburg, Dodson, Malta, and Chinook.
Markets: Largely local. Stock is shipped to St. Paul, Minneapolis, and Chicago.
Indian agency: Four miles south of Harlem, Mont., on the Great Northern Railroad.

6. RESERVATION LANDS AND ALLOTMENTS

Area of reservation as originally established	acres	622,917
Area of reservation at present	do	622,917

(*a*) *Area, classification, and estimated value of individual Indian and tribal lands*

Classification	Acres	Acre value	Total value
Now irrigated	12,123	$50	$606,150
Under canal but not irrigated	2,852	50	142,600
Irrigable by proposed works	23,285	50	1,264,250
Dry farm land	4,758	5	23,790
Grazing land	533,189	5	2,665,945
Timberland	29,964	10	269,640
Agency and school reserves	13,030	5	65,150
			4,288,775

(*b*) *Allotments.*—Allotments were made 1922 to 1924. All land, except timberland and agency, school, and other reserves, was divided into three classes—namely, irrigable, nonirrigable agricultural, and grazing—and was allotted. All Indians, regardless of age or sex, belonging to this reservation were given allotments. The following allotments were made and approved:

Classification	Number	Unit area	Total area
Irrigated agricultural	605	40	25,285
Dry farming	96	160	4,758
Grazing	1,181	320	533,189
			563,232

All allotments are held under trust patent. No fee patents have been issued, and hence no Indian land has gone into white ownership.

7. POPULATION AND INDIAN HEALTH CONDITIONS

(*a*) *Indians.*—Population of reservation: 1925, 1,198; 1927, 1,202. Indian tribes: Assinniboin and Gros Ventre. Indians (fullblood), 705; Indians (mixed), 407. Indians living in permanent homes, 393 families. Cases of tuberculosis, 841; trachoma, 420. Indian births: 1925, 53; 1927, 30. Deaths, 1925, 30; 1927, 50. Indians receiving rations, 149.

8. CLIMATE

Period covered by reliable records, 1882 to 1927. Range in elevation of irrigable area, 2,300 to 3,000. Maximum temperature, 108°; minimum temperature, 57°. Average maximum temperature, 53.6°; average minimum temperature, 29.7°. Average annual precipitation, 13.69; average annual rain, not kept separate. Average annual snow, 36.2 inches. Average date last killing frost, spring, May 15. Average date first killing frost, fall, September 20. Average growing season, 128 days.

NOTE.—All data given under climate was furnished by the U. S. Weather Bureau, at Havre, Mont.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(*a*) *Topography.*—No topographic survey of the irrigable area has been made. The land in the Milk River Valley is level bottom land. The irrigable land in the southern part of the reservation, or in the so-called mountain units, is for the most part slightly rolling. The acre cost of clearing, plowing, leveling, and ditching the Milk River Valley land is said to be $4 to $8 per acre. On the rougher land in the southern part of the reservation the cost for this work is given as about $10 per acre.

(*b*) *Soil.*—No soil survey of the irrigable area has been made. About 75 per cent of the Milk River bottom land has a sandy silt soil of 10 to 20 feet depth, and the remainder is gumbo about 2 feet in depth. The native vegetation on the Milk River bottom land is principally buffalo grass or blue joint, and some sagebrush. Some of the land in the Milk River Valley and also some of that in the southeastern part of the reservation, principally on what is known as the

Big Warm Creek unit, is adversely affected by alkali. It is probable that the entire Milk River Valley section will have to be drained.

(*c*) *Irrigation methods and water delivery.*—Flooding is the method of irrigation used on this project, and water is delivered on demand.

(*d*) *Duty of water.*—No records have been kept. The duty is estimated at 1½ acre-feet per season.

(*e*) *Principal crops and average crop production.*—The land is devoted principally to native or wild hay and pasturage. The other principal crops are wheat, average yield 15 bushels per acre; oats, average yield 16 bushels per acre; and alfalfa, average yield 2.2 tons per acre. The soil is fertile and the low yields are believed to be due principally to poor farming methods.

10. WATER SUPPLY AND WATER RIGHTS

(*a*) *Source.*—The Milk River is the principal source of water supply for the northern part of the reservation. Water is also secured from Three Mile coulee, Snake Creek, White Bear, and Peoples Creek, and other small streams in the southern part of the reservation.

No records of stream run-off have been kept. The Indians and some of the agency officials claim that the water supply of all units other than the Milk River Canal unit is not more than sufficient to irrigate the land now in cultivation and that additional areas over which canals have been extended will have no water supply.

Three small storage reservoirs have been built in connection with this project. One of these on the Three Mile Coulee, to supply water to a part of the Milk River Valley unit which is above the Milk River Canal, ewas built in 1903, and has a capacity of 1,480 acre-feet. No records are available as to its cost. A storage reservoir on the Big Warm Creek unit, built in 1898, has a capacity of 400 acre-feet. Another small reservoir known as Duck Creek Lake, was built in 1910 and has a capacity of 1,440 acre-feet. These reservoirs are in fair condition, but the latter two in the judgment of the advisors are of but little use, as they are below most of the irrigable land and practically no use is being made of them as nearly all of the land being irrigated is above the reservoirs.

(*b*) *Project diversions.*—No reliable records have been kept, but diversions are estimated to be approximately 1½ acre-feet per acre per season on all lands irrigated.

(*c*) *Water rights.*—The so-called Winters decision (207 U. S. 564), provides for the lands of the Milk River Valley a right of first priority to 5,000 miners' inches of the water of Milk River. This quantity of water is believed sufficient for the irrigation of approximately 10,000 acres, which is about the area under the Milk River Canal. It is believed by the advisors that in order to hold this water even under the Winters decision it will be necessary to make beneficial use of it to a much greater extent than is now being done.

The other irrigated areas aside from the Milk River Canal unit are watered from small streams entirely within the reservation, so that it is not probable that their water rights can be called in question. Moreover, practically all of the water available from these small streams is now being used.

The allotment act (Public, No. 373, 66th Cong.) provides that all expenditures for irrigation heretofore or hereafter shall be reimbursable and shall constitute a lien against the land benefited and that no Indian shall acquire a priority of right to any of the waters of the reservation as against any other Indian by priority of appropriation to any extent greater than the water necessary to irrigate 40 acres.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

(*a*) *General plan*—The Fort Belknap Reservation irrigation development is divided by natural conditions into the Milk River Valley unit in the northern part of the reservation and the so-called mountain units in the southern part. These two units are some 45 miles apart. About 10,000 acres of the Milk River Valley unit is served or can be served by the Milk River Valley Canal. The remaining area of this unit which is above the Milk River Valley Canal is served by three small creeks. No topographic survey or no survey for the accurate determination of areas has been made, and as no records have been kept of stream flow, the irrigable areas or the areas for which an adequate water supply is available are not known with respect to the various units outside of the Milk River Canal unit. As a result, the estimates of acre costs are simply approximations based on assumptions of stream flow and the areas that can ultimately be served.

(*b*) *Divisions or units of project*

Name of division	Ultimate irrigable area (estimated)	Now under constructed works	Area now irrigated, 1926	Construction cost per acre to June 30, 1927
Milk River Valley units:				
Milk River Canal	11,186.48	9,000	6,530	
Three mile	1,400.00	1,000	525	
White Bear	5,280.00	1,730	1,730	
Mountain units:				
Peoples Creek	2,471.75	1,500	846	
Duck Creek unit	659.57	482	113	
Lodge Pole	2,376.71	1,500	688	
Warm Springs				
Miscellaneous and reserves	1,910.49	1,763	1,691	
	25,285.00	16,975	12,123	$15.67

(*c*) *Present condition of project.*—Ultimate irrigable area of project, as proposed, 25,285 acres; area that can now be irrigated, 16,975 acres; area now actually irrigated, 1926, 12,123 acres; total construction cost to June 30, 1927, $345,704.66; per acre construction cost to June 30, 1927, $13.65; estimated construction cost when completed (approximate), $322,000 additional; estimated per acre cost when completed (approximate), $26; per cent of project construction now completed, 67 per cent (acreage basis).

12. SUMMARY OF PROJECT FEATURES

(*a*) *Storage.*—Data applicable to this head given under (10) (a), with some additions included under following head "diversions":

(*b*) *Diversions—Milk River unit.*—Water diverted from Milk River by means of a rock-filled, timber-crib dam 180 feet 10 inches long with the fixed crest 12 feet above the apron. Movable flash boards raise the water an additional height of about 5 feet. The abutments are about 15 feet above the crest of the dam. The original abutments were entirely replaced during the winter of 1912–13 and the apron entirely replaced during the winter of 1917–18.

The original dam was completed in 1900, at a cost of $26,000. The original head gate was of timber construction and was connected to the south abutment of the dam. This head gate became unsafe for further use and was replaced in 1911. The replacement was of reinforced concrete, and the new head gate was located some 300 feet upstream from the diversion dam and a section of new canal was constructed to connect the new gate with the main canal. The head gate is in first-class condition and has every indication of being a permanent structure. The dam will undoubtedly require a replacement of abutments within the next few years and possibly the entire dam will have to be rebuilt, as the spillway portion is now 27 years old. The facing of the timber crib spillway portion has been replaced once and at the time of this replacement the crib timbers were fairly sound.

White Bear unit.—The diversion dam for the White Bear unit was originally a rock and brush dam 12 feet high and having a crest length of about 75 feet, and was built in March and April, 1909. This dam, after complete settlement had taken place, was entirely covered with a reinforced concrete facing and is in good condition and appears to be permanent.

The head gate, built in April, 1909, was originally of timber. This structure became weakened on account of decay and was destroyed by an ice gorge about 1925 and has been replaced with a heavy, reinforced concrete structure, which is in excellent condition.

Three Mile Coulee unit.—The Three Mile Coulee unit head gate is the outlet structure of the Three Mile storage reservoir. It consists of a 24-inch cast-iron pipe with concrete outlet structure and concrete gate well with cast-iron valve outlet control. The original outlet structure, built in 1892, consisted of timber but was replaced in 1908 with the cast-iron and concrete structure. This structure is in good condition.

Peoples Creek unit.—The Peoples Creek unit has a number of diversion points from Peoples Creek or tributary streams. With only one or two exceptions these diversions consist of small concrete head gates, which divert water direct from the stream without the need of a diversion dam. In one or two instances small rock and brush diversion dams have been installed. All these structures

were originally of timber, but in most cases have been replaced with concrete. The replacements were very largely put in during 1916–17.

Duck Creek Reservoir.—The Duck Creek Reservoir takes its principal supply from Peoples Creek and the diversion or supply canal is also used for irrigation of lands adjacent to it. The original head gate of this supply canal was a 2-gate timber structure, built in 1910. This structure was replaced with one of reinforced concrete about 1925.

The outlet structure of the Duck Creek Reservoir was built in 1910 of timber. The outlet was about 2 by 3 feet. This entire structure was rebuilt in 1926, a first-class reinforced-concrete outlet tunnel and headworks being installed. The outlet is controlled by means of a steel gate. The structure is in good condition.

The diversion works for the Duck Creek unit consist of a reinforced-concrete diversion weir across the channel of Duck Creek and a reinforced-concrete head gate. These structures were built about 1913 and are in good condition.

Lodge Grass unit.—The diversion works for the principal ditch in the Lodge Grass unit is of reinforced concrete and is in good condition.

Big Warm unit.—The diversion works for the Big Warm unit consist of a reinforced-concrete head gate built in 1918 to replace an old timber structure that was originally built in 1908 or 1909. The diversion from the stream is effected by means of a small rock and brush dam.

(c) Canals

	Miles
Capacity 100 to 250 second-feet	19. 5
Capacity 50 to 100 second-feet	81. 35
Capacity less than 15 second-feet	48. 25
Total	149. 10

(d) Drains.—The only drains constructed are shallow, surface-water drains, of which there are about 5 miles having capacity up to 50 cubic feet per second.

(e) Project telephone system.—There are 75 miles of agency telephone lines and four telephone stations. There are no irrigation-service telephone lines.

(f) Individual Indian ditches.—There are a large number of individual Indian ditches on the reservation. These were practically all constructed by white men intermarried with Indians or by individual Indians of less than full blood. The areas covered by these ditches range in extent from a few acres to more than 1,000 acres.

No record of these ditches has ever been made by the Indian Service, so it is impossible to give detailed data concerning them.

In some few instances small amounts have been expended by the Government in the way of surveys and in some few instances some assistance was given in structure work.

These small ditches are all taken out of the smaller tributary streams and none are taken from Milk River. In some instances the ditches are taken from springs in the mountain district and irrigate a few acres only.

The following is a partial list of the individual ditches, with the source of supply given:

Ereaux and Stevens ditch, Schultz ditch, Parry ditch, Nicholson ditch, from Peoples Creek; Jim Brown ditch, Belknap (Fox) ditch, from Jim Brown Creek; Kirkaldie ditch, Morgan ditch, from Big Warm Spring Creek; Dorrity ditch, from Snake Creek; Al Chandler ditch, from Tributary Peoples Creek.

The above include the larger and more important of the individual ditches and in addition there are numerous smaller diversions. No record of dimensions of ditches or acreages covered is available.

13. AREA AND UTILIZATION OF ARABLE AND IRRIGABLE LANDS

(a) Utilization of Government project lands

Entire project	1924	1925	1926
1. Acreage arable [1]	25, 285	25, 285	25, 285
2. Acreage irrigable [2]	16, 975	16, 975	16, 975
3. Acreage irrigated	13, 967	14, 472	12, 123
4. Acreage cultivated			2, 655
5. Total crop value			$79, 311. 90
6. Average crop value			$6. 50
7. Indians farming		135	139
8. Lessees farming		13	18
9. White owners farming	1	1	2

[1] Acreage arable—ultimate irrigable acreage when project is completed.
[2] Acreage irrigable—now under constructed works.

(b) *Utilization of land owned by Indians and not leased (Government project)*

Farmed by Indians	1924	1925	1925
1. Acreage arable	24,993	24,993	24,993
2. Acreage irrigable	24,701	24,701	24,701
3. Acreage irrigated	13,764	13,275	9,699
4. Acreage cultivated			1,805
5. Families farming		135	139
6. Cultivated per family			13
7. Total crop value			$54,918.30
8. Crop value—acre			$5.66
9. Crop value—family			$395.00

(c) *Utilization of land owned by Indians and leased (Government project)*

Lessee	1924	1925	1926
1. Acreage irrigated		821	2,281
2. Acreage cultivated		821	707
3. Number of lessees		13	13
4. Total crop value [3]			$24,393.60
5. Crop value—acre			$10.70

(d) *Utilization of land owned by white owners*

	1924	1925	1925
1. Acreage irrigated	103	103	143
2. Acreage cultivated	103	103	143
3. Number of owners [4]	1	1	2

[3] Includes crop value of owners and lessees.
[4] 2 Catholic missions.

14. PRINCIPAL CROPS, CROP YIELDS, AND RETURNS

(a) *Indian farmers, 1926*

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre	Total value
Wheat	743	13.4 bushels	$1.20	$16.08	$11,958.00
Oats	288	14.0 bushels	.80	11.20	3,882.40
Alfalfa	533	2.21 tons	8.00	17.68	9,440.00
Gardens	82			25.54	2,081.10
Potatoes	4	11,950 pounds	.02	239.00	956.00
Flax	146	3.72 bushels	1.80	6.70	977.40
Barley	10	26.5 bushels	.36	9.54	95.40
Native hay	7,894	0.404 ton	8.00	3.23	25,528.00
Total	9,699				54,918.30

(b) *White farmers (owners and lessees), 1926*

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre	Total value
Wheat	113	11.95 bushels	$1.20	$14.39	$1,622.40
Oats	143	15.45 bushels	.80	12.38	1,768.80
Alfalfa	51	1.96 tons	8.00	15.69	800.00
Gardens	18		.02	149.50	2,693.40
Potatoes	19	5,925 bushels	.02	118.50	2,194.00
Flax	486	9.0 bushels	1.80	16.20	7,875.00
Barley	20	50 bushels	.36	18.00	360.00
Native hay	1,574	0.562 ton	8.00	4.50	7,080.00
Total	2,424				24,393.60

NOTE: No irrigable land is dry farmed.

15. Economic conditions among project farmers

Indians	1924	1925	1926
1. Number of Indian farms [1]	[2]	[2]	605
2. Indian families farming	[2]	[2]	139
3. Livestock:			
Horses	[2]	[2]	2,975
Cattle, beef	[2]	[2]	2,042
Cattle, dairy	[2]	[2]	92
Sheep	[2]	[2]	None.
Hogs	[2]	[2]	300
4. Estimated value livestock (total value)	[2]	[2]	$114,680
5. Equipment:			
Plows			
Mowers			
Tractors	[2]	[2]	$26,000
Trucks			
Autos			
6. Estimated value equipment per farm	[2]	[2]	$187
7. Acreage farmed by Indians	[2]	[2]	9,699
8. Acreage farmed per family	[2]	[2]	70
9. Average crop value per acre	[2]	[2]	$6
10. Average crop value per family	[2]	[2]	$397
11. Per acre construction assessment against Indians	None.	None.	None.
12. Per acre operation and maintenance assessment against Indians	None.	None.	None.
13. Acres Indian land leased, irrigated			$3,640
14. Average rental per acre:			
Irrigated			[6] 1.75
Not irrigated			[6] .11
15. Approximate total rental			$38,072
16. Indian land sold:			
Irrigable	0	0	0
Not irrigable	0	0	0
17. Average sale price per acre:			
Irrigable	[3]	[3]	[3]
Not irrigable	[3]	[3]	[3]
18. Approximate total sale price			
19. Number Indians receiving payments from timber, agricultural, and grazing leases, oil, power, etc			1,013
20. Average per capita payment from above sources			$37.58
21. Average total payment to Indians from above sources	[4]	[4]	[4]
22. Indian reimbursable indebtedness June 30, 1927 (not including irrigation)			$45,318
23. Number Indians receiving rations			149
24. Indian tribal fund (amount) June 30, 1927			$52,923
25. Source of tribal fund	[5]	[5]	[5]

[1] Total number individual irrigable allotments.
[2] Data not available.
[3] No land sold.
[4] Data not furnished.
[5] Grazing leases.
[6] Approximate.

16. PROJECT OPERATION AND MAINTENANCE

(*a*) *Organization*

Employee:	Salary
General foreman in charge of project [1]	$2,100
Foreman of maintenance and construction work [1]	1,500
Ditch rider and maintenance foreman [1]	1,320
Ditch rider and maintenance foreman [1]	1,620

(*b*) *Annual expense*

Total amount paid for labor during fiscal year 1927 (no record is readily available to separate this item)	$17,567.33
Total charge to operation and maintenance for fiscal year 1927	12,298.33
Total charge to operation and maintenance for fiscal year 1926	15,262.93

The ditch riders are employed throughout the year and a considerable part of the maintenance work is done by them personally at times when water is not being delivered. The ditch riders furnish their own horse and forage. In addition to the net salary shown they are given quarters, fuel, and lights, for which they pay.

[1] Quarters, fuel, and lights furnished.

One ditch rider has 83 miles of canals and laterals, and the other had 38 miles. The mountain unit rider has some 3,500 acres in his district, which is quite widely scattered. The one regular rider on the valley units has about 13,400 acres of land under constructed works. He is assisted during rush periods by the foreman and sometimes by irregular labor.

(c) *Comparison with neighboring irrigation projects, either Government, corporate, or private*

	Fort Belknap project	Milk River reclamation project
Elevation	2,300 feet	2,250 feet.
Growing season, average	128 days	128 days.
Soil	Sand loam and gumbo	Sand loam and gumbo.
Water supply	Milk River and tributaries.	Milk River and tributaries.
Water service	On demand	On demand.
Crops grown	Grain, hay, and root	Grain, hay, and root.
Per-acre crop value, average	$7.37	$23.
Quality of construction	Fair	Fair.
Total construction cost	$345,704.66	
Annual per-acre constructoin assessment	None	None.[1]
Annual per-acre operation and maintenance assessment	$1	50 cents plus 50 cents per acre-foot.
Per cent of irrigable land cultivated	48 per cent	34 per cent, approximately.

[1] Construction assessment will be $1.42½ per acre after 1932 on Glasgow and Malta districts.

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(a) *Construction costs and collections to June 30, 1927*

Expended from the following funds:		
Reimbursable moneys	$346, 925. 70	
Indian tribal moneys	9, 969. 95	
		$356, 893. 65
Less inventory adjustments		11, 030. 89
Total construction cost		345, 864. 76
Estimated cost to complete for 25,285 acres, the total proposed ultimate area		322, 000. 00
Present cost per acre		13. 65
Estimated per acre cost when completed		26. 00
Per acre value of land without irrigation		5–10. 00
Per acre value, land when irrigated		50. 00
Increased per acre value by irrigation		40. 00

(b) *Collection of construction cost*

No instructions have been issued compelling the assessment of annual construction charges on this project.

(c) *Operation and maintenance cost and collections to June 30, 1927*

Expended from the following funds:	
Reimbursable moneys	$241, 607. 94
Maintenance collections	320. 48
Total	241, 928. 42

(d) *Operation and maintenance collections to June 30, 1927*

The area to which water can be delivered from constructed works is used as the basis for computing the per acre annual operation and maintenance assessment. The regular operation and maintenance assessments are made for one year. Up to and including the season of 1926, assessments were made in the fall, and due December 1.

Collections are made from lessees only and in order to enforce collections the delivery of water is refused and a 7 per cent penalty after due date is charged.

Actual operation and maintenance cost for fiscal year is divided by the area under constructed works and to which water can be delivered. This method of computing assessments seems fair and satisfactory. Example: Operation and maintenance actual cost, fiscal year 1926, $15,262.93. Area under constructed works, 16,975 acres. Acreage cost, 90 cents.

Total operation and maintenance assessments to June 30, 1927	$3,049.05
Total operation and maintenance collections to June 30, 1927	1,479.35
Total operation and maintenance collections to June 30, 1927 from:	
Indians	None.
White owners	None.
Lessees	$1,479.35
Total operation and maintenance delinquencies to date	1,569.70
Total penalties on delinquencies to date	12.34

18. PROJECT PROBLEMS AND COMPLAINTS, WITH CONCLUSIONS AND RECOMMENDATIONS

Irrigation development on the Fort Belknap Indian Reservation is by natural conditions restricted to two widely separated localities: (1) Along the Milk River, which is the northern boundary of the reservation, there is an irrigable area of about 17,800 acres of level, fertile, bottom land, of which about 11,100 acres are irrigable from Milk River, and the remainder is irriaable from small streams within the reservation; (2) among the mountains in the southern part of the reservation a number of small widely scattered areas are irrigated from small streams within the reservation. The aggregate irrigable area of these mountain units is given as 7,400 acres, but it is the opinion of the advisers, based on their personal inspection of the territory and the meager data before them, that the water supply available is not sufficient for any more than the land now being irrigated, about 3,300 acres. The quality of some of the land is questionable. As a matter of fact some areas in the southeastern part of the reservation are even now badly alkalied and this condition will of course grow worse as irrigation without drainage is continued. These mountain units are 45 to 60 miles from the nearest railroad shipping point and the road is frequently impassable. Being so far from transportation and marketing facilities, this land can never be utilized for commercial farming, but can be devoted only to subsistence farming. Accordingly, it is considered improbable that the Indians living on this part of the reservation will ever be able to repay any part of the cost of the irrigation development.

Milk River unit the only one feasible.—The Milk River unit, in the opinion of the advisors, is the only area within this reservation that offers a prospect of success as an irrigation project. It consists of 17,800 acres, much of which is land with a fairly fertile soil, and seemingly there is an adequate water supply available or obtainable from existing sources. This area is well supplied with transportation and marketing facilities, as the Great Northern Railroad with several towns and shipping points is within a few miles, and an improved highway passes near the irrigable land. There is a sugar factory at Chinook, Mont., a nearby town, and it is predicted by many that the Milk River Valley will in time become an important beet-growing section.

Failure to utilize land endangers water right.—Failure to utilize the land, involving the incidental failure to beneficially use the water, in the judgment of the advisors, is by far the most serious problem on this reservation and one that should receive immediate consideration. The land within the reservation that is served by the Milk River Canal, by the terms of the well-known Winters Decision of the Supreme Court (148 Fed., 684-1906) was decreed a right of first priority to 5,000 miners inches of the water of Milk River. It is manifest that in this decree the Indians received a benevolent measure of justice, not alone as the result of the Government's contention as set forth in the complaint wherein it is stated the Indians "have for many years past grown crops of grass, grain, and vegetables on about 30,000 acres of land," but also because of further representations compelling the conclusion that this water is necessary to enable the Indians to gain a livelihood, and encouraging the hope that as civilization advanced among them they would continue to increase the extent of their farming operations, and improve their methods of farming. A comparison of the area irrigated on the entire reservation by the Indians to-day: 9,699 acres, of which only 1,805 acres is being cultivated; with the area alleged to have been utilized at the time the Government's complaint in the case United States *v.* Winters was prepared; 30,000 acres on which they raised "crops of grass, grain, and vegetables," clearly indicates that either there was an error in the area,

as stated in the complaint, or the Indians have greatly decreased rather than increased their farming operations.

One of the fundamental principles underlying irrigation law and custom is the doctrine that beneficial use is the measure to the right, and to the quantity, of water, that can be rightfully held. This is a principle that is essentially fair and just, and without it, development of our arid West would be greatly hampered and retarded. It is not to be expected that water can long be held for the irrigation of wild hay and pasture, even though it be on an Indian reservation, if there be a demand for it, as there soon will be, for the purpose of growing potatoes and sugar beets on adjacent lands outside the reservation.

Unless this water is beneficially used in the generally accepted sense of the term, there can be no doubt but that it will be lost. It should be borne in mind that this water right was secured as the result of a prolonged period of litigation that necessarily involved considerable expense, not alone on the part of the Government, but also on the part of the defendants, who in addition to the expenses directly incident to the litigation, necessarily suffered a considerable depreciation in their land values as a result of the loss of water rights which they claimed. In view of all this it would constitute a breach of faith on the part of the Government now to let this water right go by default or failure to use. Aside from the moral obligation compelling the beneficial use of this water there is also the economic consideration, that the Government is not justified in building, and in operating and maintaining irrigation projects for the purpose of growing wild hay and pasture. So long as such crops are grown, there is no possibility of recovering any considerable part of the money expended by the Government.

Accumulation of irrigation charges will soon exceed value of land.—Another disastrous result of the failure to utilize land, second only to the loss of the water right, is the accumulation of irrigation charges. As soon as an irrigation project is constructed, it begins to deteriorate and must be maintained, and must be operated to the extent necessary to serve water to the land being used. On Indian projects, as one of the unsatisfactory results of the alloting systems, and unless much of the land is leased, the farming will be confined to small isolated plots scattered over the entire project, thus making it necessary to maintain and operate practically the entire system even though but a small part of the irrigable land is being used. Under such circumstances, it is necessary, and it is the general rule to assess irrigation, operation, and maintenance charges against all land provided with irrigation facilities, regardless of whether the land is irrigated or not. If the land is not being used there is no possibility of collecting the annual irrigation charges, and they are carried as a lien against the land, while the funds for operation and maintenance are provided by a congressional appropriation.

The average accumulated irrigation, operation, and maintenance charges on the Fort Belknap project is $14.30 per acre.

Leasing offers only possibility of utilizing land.—By the system of allotting lands to Indians, each Indian usually receives a tract of the size considered sufficient for one family. The result is that in many instances one family may have more land than four or five families would have use for, or could farm, even if they were disposed to farm, and had the necessary capital to start in the farming business.

Under such circumstances the only method that appears feasible for bringing the land that can not be farmed by the Indians into cultivation, is by leasing.

On this reservation it will be necessary to offer much more attractive terms than those now offered in order to get desirable lessees—ones who are successful farmers. Long-term leases—7 to 10 years—will be necessary; operation and maintenance charges will have to be reduced by economy in the work and a reduction in personnel; accumulated operation and maintenance charges will have to be suspended, or spread over a long term of years; and it is believed consideration should be given to placing on the farms to be leased, a suitable dwelling house and farm buildings for the use of the lessee. Such buildings could be financed by an appropriation to be made a lien on the land. After the expiration of the lease they would be available for the use of the Indian owner.

One principal obstacle to leasing is the fact that many Indians demand a cash rental for their land, and refuse to sign leases unless their demands are met. In such cases the agent should have authority to lease without the consent of the Indian, as the principal consideration is to bring the land into use and put it in condition to repay the irrigation charges that have been advanced by the Government.

Indians as farmers.—The Indians of this reservation with but one outstanding exception, are very poor farmers, principally because they do not know how to

farm. They have never received that intelligent, well-sustained instruction, assistance, and encouragement that farmers in general have come to recognize as essential to their welfare and are willing to pay for.

It is believed that there is a good possibility on this reservation, with the instruction and assistance a farm instructor of the usual county agent caliber could give the Indians, to work out a type of agriculture involving a combination of the livestock industry—sheep or cattle—along with the ordinary farming, that would appeal to the Indians and enable them to make use of the natural resources of their reservation with some profit to themselves. This will never be accomplished by the type of farmer usually employed by the Government to teach the Indians.

Much has been said in various reports and in congressional hearings about the possibilities of this reservation as a beet-growing section, and the prospect for the success of the Indians in this industry. Our observations of farm methods and interviews with Indian farmers convinced us that there is but one Indian farmer here who may attain success as a beet grower. We are also firmly of the opinion that at their present stage of development, it would be inadvisable to supply these Indians with capital, or any expensive equipment, or improvements on their farms, with the idea that they will be able to pay for the same from their farming. Before anything of this kind can be attempted with any hope of success, there will have to be for these Indians a long, well-sustained course of instruction and assistance, gradually working up from small beginnings, under the leadership of a farm instructor or agricultural advisor sufficiently well equipped by education, training, and experience to awaken and hold the interest of the Indians and to demonstrate that satisfactory results can be attained.

On much of the land now under irrigation works on this reservation the value of the principal crop, wild hay, is but little more than the actual cost of harvesting and stacking. For example, the return from wild hay for 1926 was $3.25 per acre, while the cost to the Indian for harvesting and stacking was $2.50 per acre. How can it be expected that irrigated land used for such a low valued crop can pay irrigation charges?

Question as to adequacy of water supply.—It is our judgment, based on our own observations and statements of the Indians, reservation employees and others familiar with conditions, that the water supply for all units of this reservation other than the Milk River Canal Unit, is no more than sufficient for the areas now being irrigated, and that a costly mistake has been made in extending canals over considerable areas for which in ordinary years there will be no water.

Necessity for economy in irrigation operations.—This project is burdened with an overhead charge for regular employees entirely out of proportion to the results attained. Four regular employees—a general foreman, foreman, and two ditch riders—are kept on the pay roll for the entire year. Their salaries aggregate over $6,500, and adding to this the value of perquisites, house rent, fuel, lights, etc., supplied by the Government. This one item alone involves an expenditure of about $8,000 annually. The advisors can see no justification for the employment of ditch riders for the entire year in a country with a growing season of four months. The Indians complain that in the winter these ditch riders "loaf and draw their pay." This is about all they could possibly be expected to do. Such employment, if an oversight, indicates lack of supervision. If not an oversight, it in the opinion of the advisers amounts to criminal negligence on the part of whoever is responsible.

Question as to applicability of funds.—It is noted that no congressional appropriations were specifically made for any work other than the Milk River unit until 1916, while work on the so-called mountain unit was begun in 1909. The advisers question the legality and propriety of thus using funds appropriated by Congress for work other than that for which it was specifically appropriated.

Fact versus fancy—Inaccuracy of data.—Not only on this reservation, but on most of the reservations, considered in this study, it was noted that there is an almost universal tendency on the part of employees, in the compilation and preparation of reports and justifications, to be extremely optimistic. Fact frequently is so richly embellished with fancy that the picture fails to give an accurate idea of the true conditions. It is our conclusion that this usual tendency toward exaggeration is the result, first, of that profound spirit of optimism concerning the Indian and his welfare with which many Indian Service employees are imbued, and without which they could not successfully carry on their work; and second, of a feeling or a realization on the part of many employees—apparently but unwittingly and unintentionally encouraged by the Indian Office—that tenure of employment, salaries, and promotions all depend upon the fact as to whether each successive report shows an improvement in the conditions described

in preceding reports. Thus the teacher feels it to his interest to report an increase in the interest of Indian children in their school work, the farmer is desirous of showing an increase in the farm operation of Indian farmers, the physician is anxious to show an improvement in health conditions.

On one reservation—not however the one now under consideration—we were informed by two employees in responsible positions that the superintendent's admonition to certain of his employees charged with the preparation of the annual report was "The Indian Office expects a lot of hot air about the farming of the Indians and it's up to us to give it to them, or they'll put employees in here who will give it to them."

On another reservation, inquiry elicited the fact that no farm survey had been made for several years, and the reluctant admission that the data respecting the acreage cultivated, and crops produced by the Indians as included in reports had for several years been arrived at by adding a "healthy increase" each year to the data for the preceding year. This method fails to take into consideration that frequently there may be a "healthy decrease."

The general result is that much of the data is unreliable and inconsistent. This fact was pointed out, and employees who were called upon to collect data for us were particularly requested to have it as nearly accurate as practicable. Despite our efforts to secure reasonably accurate data, it is believed that with respect to some of the reservations, the data is far from accurate. Particularly, there is noted a tendency on the part of some of the irrigation employees to extend "irrigation works" over areas of land where there is no need for them, and apparently without regard to whether or not there is a water supply for such land. These so-called irrigation works sometimes consist of the merest skeleton—a furrow for a ditch—but they justify a request for increased appropriations "for extending the irrigation system to the lands of Indians who are anxious to farm," and after the extensions are made they form a justification for increased appropriations for operation and maintenance.

In the judgment of the advisers this mistake has been made on all units of the Fort Belknap Reservation other than the Milk River Canal unit, and that much of the land, though nominally under "constructed works," is not, and never will be irrigable—that is possible of irrigation—for the reason that there is not a water supply. Under such circumstances it is manifestly an injustice to assess such lands with irrigation charges.

Inadequate supervision results in work of questionable necessity.—On this as well as some other reservations, where comparatively large congressional appropriations are received for operation, maintenance, and improvement, there was noted a tendency to spend all the money provided by the appropriation regardless of actual necessity, for the reason that expenditure of practically the entire amount would be considered as the best justification of continuing the appro-appropriations without a decrease. Many employees charged with irrigation work feel that if a substantial part of an appropriation is turned back as an unexpended balance, Congress will probably reduce the appropriation for the following year by the saving effected the previous year.

Manifestly this attitude, unless there is close supervision by some one who seriously appreciates the real significance of the reimbursable provision in appropriation acts, results at times in the doing of considerable work of doubtful necessity. As an instance, your advisers at the time of their visit to the Fort Belknap Reservation observed two pieces of work in progress, estimated to cost $3,000, for which they failed to see sufficient justification. One of these was the raising of the bank of a canal in the Milk River Valley unit, for the reason that as the result of an unusual flood of the Milk River a few days previously, the water had overtopped the bank—the first occurrence of this kind, as we were informed, since the project was built some 20 years ago—and caused some damage to crops. The crop damage could not have been much, as the principal crop is wild hay.

The other work of questionable advisability, was the replacement of a flume, estimated to cost $1,500, on a ditch of one of the mountain units that at the present time carries water to a small storage reservoir that irrigates one Indian farm. It is the judgment of the advisers that the original construction of this ditch and reservoir was a mistake, and that its operation and maintenance is in no way justified. With the one exception noted, the Indians refuse to move onto this land as they complain there is no water for it. Moreover, as the reservoir, known as Duck Lake, is below all the irrigated land, we are unable to see any reason why it ever should have been built. There is absolutely no possibility whatever that Government money expended in such work as the last instance just referred to can ever be returned to the Treasury. It is simply a waste of money for which there is no reasonable justification.

Irrigation on Blackfeet

1. RECOMMENDATION

In view of the conditions described in our report on this project, particularly in sections 2 and 18 thereof, wherein it is shown, in the judgment of the advisors, that this project presents a hopeless situation for which there is no feasible remedy, and since the continuance of the project can serve only to increase the large loss that eventually will have to be met, it is recommended:

1. That this project be abandoned at the close of this irrigation season (1928) making such arrangements with lessees and white land owners now on the project as may be equitable.

2. That, in view of the above recommendation, none of the money now available, or made available for the coming fiscal year, be expended in making permanent improvements, until this project shall have received further study by Congress.

2. SYNOPSIS

The Blackfeet Indian Reservation, in northwestern Montana, was established by Executive order of July 5, 1873. It is just east of Glacier National Park, which prior to 1896 was a part of the reservation. The Great Northern Railroad passes through the southern part of the reservation, and the towns of Browning (the seat of the Indian agency and school), Blackfeet, Cut Bank, and Sundance are on the railroad. There are two improved highways, the Park to Park (Yellowstone to Glacier) and the Roosevelt Highway.

Area and allotments.—The area of the reservation is given as 1,421,745 acres.

Allotments of land aggregating 400 acres each (usually 360 acres grazing land and 40 acres irrigable land) were made (1907 to 1930) to all Indians then living. It is reported that 74 deceased Indian allotments have been sold and that 600 Indians, having received fee patents have disposed of their original allotments, but still have their allotments designated as homesteads (grazing land) of 80 acres, which are held by trust patent.

Population and Indian health.—There are on this reservation (1927) 3,375 Indians of the Blackfeet, Piegan and Blood Tribes. Of these 1,104 are full-bloods. It is reported that there are 340 cases of tuberculosis and 96 cases of trachoma. Three hundred and thirty Indians are receiving rations.

Climate.—Range in altitude of irrigable area 3,800 to 4,000. Range in temperature 99 to 46° below zero. Average annual precipitation 11.75 inches. Average growing season 90 to 110 days.

Topography, soil, and drainage.—Much of the land is comparatively level with a uniform slope and some of it is gently rolling. No soil survey has been made. Soils range from light sandy loams to coarse sand with heavy gravel or bowlders. The native vegetation is blue-joint grass. Subsoil is gravel or bowlders conducive to good drainage. No drainage has been necessary.

The cost of preparing the land for irrigation ranges from $10 to $20 per acre.

General plan of irrigation development.—This project, as well as the Fort Peck and Flathead projects was built and operated and maintained until 1924 by the Reclamation Service, under an agreement entered into in 1908 between that service and the Indian Bureau.

As originally planned, this project embraced six units. Four of these—the Badger-Fisher, Two Medicine, Birch Creek and Piegan units have been partially constructed. The irrigable area (proposed and present), irrigated area, construction cost to June 30, 1927, and estimated cost for completion for each of the four partially constructed units are as follows:

Unit	Proposed irrigable	Present irrigable	Acreage irrigated (1926)	Construction cost to June 30, 1927	Estimated cost to complete
Badger-Fisher	30,000	9,649	4,630	$473,943.16	$411,023.00
Two Medicine	44,000	7,186	2,089	571,366.36	1,183,138.00
Birch Creek	3,500	2,253	337	23,736.53	8,555.00
Piegan	3,000	2,242	94	20,238.78	11,313.00
Total	80,500	21,330	7,150	1,089,284.83	1,614,029.00

Summary of project works.—There are two storage reservoirs: The Two-Medicine, capacity 16,000 acre-feet; and the Four Horns, present capacity 4,000

acre-feet. There are 362 miles of canals and laterals, ranging from 5 to 500 second-feet; 226 concrete structures, 1,563 wood structures, 8,563 feet concrete pipe, 1,462 feet metal pipe, and 1,030 feet wood pipe, 1,216 feet metal flume, and 691 feet wood flume. The project buildings are 1 office, 7 cottages, and 5 barns. There are 140 miles of telephone line, with 11 stations.

Utilization of project lands; crops and crop values.—The data supplied by the project engineer as to the status of ownership, and the utilization of land on this project is fragmentary and inconsistent. The acreage now irrigable from constructed works is given as 21,377, of which it is reported 7,150 acres (practically one-third) was irrigated in 1926.

Indians make practically no use of the project. In 1926 only 10 Indians farmed; they irrigated only 45 acres (six-tenths of 1 per cent of the land irrigated), of which 40 acres was in alfalfa, 4 acres in wild hay, and 1 acre in garden. (See sec. 14.) The acre crop value on Indian-farmed land is given as $19.82, which is probably in error, as on leased land it is given as only $11.50.

It is reported that 7,106 acres were farmed by white owners and lessees. Of this, 1,274 acres were wild hay and pasture, leaving about 5,832 acres in cultivated crops. Three thousand eight hundred and seventy-four acres—about 66 per cent of the cultivated area—were in wheat, with an estimated acre yield of only 13 bushels per acre. Nearly 2,000 acres of project lands were dry farmed, the estimated crop value being given as $8.64 per acre, while the estimated crop value on lands irrigated by white farmers is given as $14.41 per acre. In 1924, 4,048 acres were irrigated, while 3,088 acres of irrigation project lands were dry farmed.

The estimated value of all crops grown on the project in 1926 is given as $102,125, of which the Indians produced $882, or a little less than nine-tenths of 1 per cent.

Project operation and maintenance organization.—The employment of nine regular full-time employees on this project, with salaries aggregating $15,840, we believe to be unjustifiable. Two water masters and four ditch riders, at salaries aggregating $9,540, are carried on the pay roll the entire year, although the growing and irrigation season is but three of four months. It would require a charge of more than $2 an acre on the 7,150 acres being irrigated to pay the regular salaried employees.

Construction cost and collections.—The construction cost of the Blackfeet project to June 30, 1927, was $1,094,653.89. The total assessments were $64,008.93, of which $14,412.73 had been collected, leaving a delinquency of $49,596.20. In accordance with the order of the Secretary of the Interior of November 29, 1920, in pursuance of the act of February 14, 1920 (41 Stat. 409), annual assessments of 50 cents per irrigable acre were begun in 1920 against all lands under constructed irrigation works.

Operation and maintenance cost and collections.—The total operation and maintenance cost to June 30, 1927, was $256,380.17. The actual operating and maintenance deficit, or excess of cost over collections is $196,610.65. This deficit, particularly that part of it on white-owned land and Indian-owned land leased is the result of delivery of water on a rental basis at a nominal rate much less than the actual cost of the service while the project was under the management of the Reclamation Service, and the failure to make collections since the management was taken over by the Indian Service. As an instance, although the total of assessments on white-owned land for the season of 1926 was $7,736, only $3,356.40 was collected. The same year the delinquency on Indian-owned land leased, as given by the project engineer, was $9,404, and the excess of the operation-maintenance cost over receipts or collections for the years 1924, 1925, and 1926 was $33,191.73.

Government investment.—The total investment of the United States in the Blackfeet Reservation irrigation project to June 30, 1927, was:

Construction cost to June 30, 1927		$1,094,653.89
Operation and maintenance cost to June 30, 1927		256,380.17
Total cost to June 30, 1927		1,351,034.06
Less collections on construction cost	$14,412.73	
Less collections on operation and maintenance cost	59,769.52	
Total collections		74,182.25
Net investment to June 30, 1927		1,276,851.81

Probable returns on Government investment.—For the fiscal years 1927, 1928, and 1929 the operation and maintenance appropriation made by Congress has been restricted to the Two Medicine and Badger-Fisher units of the project, the intention being apparently to abandon the Piegan and Birch Creek units.

The total net cost to June 30, 1927, of the Piegan unit is $21,697.93 and of the Birch Creek unit, $30,949.80, or a total for the two units already abandoned of $52,647.73. If these units are permanently abandoned, it is believed any construction collections should be refunded or credited to operation and maintenance assessments against the lands affected.

3. DIGEST OF LEGISLATION

Act of June 10, 1896 (29 Stat. 354): Ratifying an agreement with the Indians of the Blackfeet Reservation provides that in consideration of the cession to the United States of certain lands theretofore a part of their reservation (embracing the area now included in the Glacier National Park) there shall be advanced and (or) expended for their benefit during a period of 10 years "the sum of $1,500,000" * * *.

Such sums, or so much thereof as may be necessary in any one year, shall be expended in the purchase of cows, bulls, and other livestock, goods, clothing, subsistence, agricultural implements, in providing employees, in the education of Indian children, in procuring medicine and medical attendance, in the care and support of the aged, sick, and infirm, and of helpless orphans, in the erection and keeping in repair of such new agency and school buildings, mills, blacksmith, carpenter, and wagon shops as may be necessary, in assisting the Indians to build and keep in repair their houses, inclose and irrigate their farms, and in such other ways as may best promote their civilization and improvement.

Act March 1, 1907 (34 Stat. 1035): The Secretary of the Interior is hereby authorized and directed to immediately cause to be surveyed all of the lands embraced within the limits of the Blackfeet Indian Reservation, in the State of Montana.

That so soon as all the lands embraced within the said Blackfeet Indian Reservation shall have been surveyed, the Commissioner of Indian Affairs shall cause allotments of the same to be made under the provisions of the allotment laws of the United States to all persons having tribal rights or holding tribal relations and who may rightfully belong on said reservation. That there shall be allotted to each member 40 acres of irrigable land and 280 acres of additional land valuable only for grazing purposes; or, at the option of the allottee, the entire 320 acres may be taken in land valuable only for grazing purposes, respectively, and for constructing irrigating systems to irrigate the aforesaid allotted lands, $300,000, $100,000 of which shall be immediately available, the cost of said entire work to be reimbursed from the proceeds of the sale of the lands within said reservation: *Provided*, That the Indians and the settlers on the surplus land, in the order named, shall have a preference right for one year from the date of the President's proclamation opening the reservation to settlement to appropriate the waters of the reservation, which shall be filed on and appropriated under the laws of the State of Montana by the Commissioner of Indian Affairs on behalf of the Indians taking irrigable allotments and by the settlers under the same law. At the expiration of the one year aforesaid the irrigation system constructed and to be constructed shall be operated under the laws of the State of Montana, and the title to such systems as may be constructed under this act, until otherwise provided by law, shall be in the Secretary of the Interior in trust for the said Indians, and he may sue and be sued in matters relating thereto: *And provided further*, That the ditches and canals of such irrigation systems may be used, extended, or enlarged for the purpose of conveying water by any person, association, or corporation under and upon compliance with the provisions of the laws of the State of Montana: *And provided further*, That when said irrigation systems are in successful operation the cost of operating the same shall be equitably apportioned upon the lands irrigated, and when the Indians have become self-supporting to the annual charge shall be added an amount sufficient to pay back into the Treasury the cost of the work done in their behalf within 30 years, suitable deduction being made for the amounts received from the disposal of the lands within the reservation aforesaid: *Provided*, That the right to the use of water acquired under the provisions of this act shall be appurtenant to the land irrigated, and beneficial use shall be the basis, the measure, and the limit of the right. * * *.

Act April 4, 1910 (36 Stat. 277): For construction of irrigation systems to irrigate the allotted lands of the Indians of the Blackfeet Indian Reservation in Montana and the unallotted irrigable lands to be disposed of under authority of law, including the necessary surveys, plans, and estimates, $200,000: *Provided*, That the amount hereby appropriated and all moneys heretofore or hereafter to be appropriated for this project shall be repaid into the Treasury of the United States in accordance with the provisions of the act of March 1, 1907.

Act March 3, 1911 (36 Stat. 1066): For the same purposes as specified in the act of April 4, 1910, supra, $200,000.

Act of August 24, 1912 (37 Stat. 526): For the same purposes as stipulated and to be reimbusred in the same manner as described in the act of April 4, 1910, as above, $100,000.

Act June 30, 1913 (38 Stat. 90): For the same purposes as stipulated and to be reimbursed in the same manner as described in the act of April 4, 1910, supra, $150,000.

Act August 1, 1914 (38 Stat. 593): For the same purposes as stipulated and to be reimbursed in the same manner as described in the act of April 4, 1910, above, $50,000.

Joint resolution March 4, 1915 (38 Stat. 1228): Reenacted the item of August 1, 1914, for the fiscal year 1916.

Act May 18, 1916 (39 Stat. 140): For continuing construction of the irrigation systems on the Blackfeet Indian Reservation, in Montana, $25,000 (reimbursable), which shall be immediately available: *Provided*, That the entrymen upon the surplus unallotted lands to be irrigated by such systems shall, in addition to compliance with the homestead laws, before receiving patents for the lands covered by his entry, pay the charges apportioned against such tract as herein authorized, and a failure to make any two payments when due shall render this entry subject to cancellation, with the forfeiture to the United States of all rights acquired under the provisions of this act, as well as of any moneys paid on account thereof. The purchaser of any Indian allotment to be irrigated by such systems, purchased upon approval of the Secretary of the Interior, before the charges against said allotment herein authorized shall have been paid, shall pay all charges remaining unpaid at the time of such purchase and in all patents or deeds for such purchased allotments, and also in all patents in fee to allottees or their heirs issued before payment, of all such charges berein authorized to be made against their allotments, there shall be expressed that there is reserved upon the lands therein described a lien for such charges, and such lein may be enforced; or, upon payment of the delinquent charges, may be released by the Secretary of the Interior.

The work to be done with the amounts herein appropriated for the completion of the Blackfeet, Flathead, and Fort Peck projects may be done by the Reclamation Service on plans and estimates furnished by that service and approved by the Commissioner of Indian Affairs: *Provided*, That not to exceed $15,000 of applicable appropriations made for the Flathead, Blackfeet, and Fort Peck irrigation projects shall be available for the maintenance, repair, and operation of motor-propelled and horse-drawn passenger-carrying vehicles for official use upon the aforesaid irrigation projects: *Provided further*, That not to exceed $7,500 may be used for the purchase of horse-drawn passenger-carrying vehicles, and that not to exceed $1,500 may be used for the purchase of motor-propelled passenger-carrying vehicles.

That the Secretary of the Interior be, and he is hereby, authorized and directed to announce, at such time as in his opinion seems proper, the charge for construction of irrigation systems on the Blackfeet, Flathead, and Fort Peck Indian Reservations in Montana, which shall be made against each acre of land irrigable by the systems on each of said reservations. Such charges shall be assessed against the land irrigable by the systems on each said reservation in the proportion of the total construction cost which each acre of such land bears to the whole area of irrigable land thereunder.

On the 1st day of December after the announcement by the Secretary of the Interior of the construction charge the allottee, entryman, purchaser, or owner of such irrigable land which might have been furnished water for irrigation during the whole of the preceding irrigation season, from ditches actually constructed, shall pay to the superintendent of the reservation where the land is located, for deposit to the credit of the United States as a reimbursement of the appropriations made or to be made for construction of said irrigation systems, 5 per cent of the construction charge fixed for this land, as an initial installment, and shall

pay the balance of the charge in 15 annual installments, the first 5 of which shall each be 5 per cent of the construction charge and the remainder shall each be 7 per cent of the construction charge. The first of the annual installments shall become due and payable on December 1 of the fifth calendar year after the initial installment, *Provided*, That any allottee, entryman, purchaser, or owner may, if he so elects, pay the whole or any part of the construction charges within any shorter period: *Provided further*, That the Secretary of the Interior may, in his discretion, grant such extension of the time for payments herein acquired from Indian allottees or their heirs as he may determine proper and necessary, so long as such land remains in Indian title.

That the tribal funds heretofore covered into the Treasury of the United States in partial reimbursement of appropriations made for constructing irrigation systems on said reservations shall be placed to the credit of the tribe and be available for such expenditure for the benefit of the tribe as Congress may hereafter direct.

The cost of constructing the irrigation systems to irrigate allotted lands of the Indians on these reservations shall be reimbursed to the United States as hereinbefore provided, and no further reimbursements from the tribal funds shall be made on account of said irrigation works except that all charges against Indian allottees or their heirs herein authorized, unless otherwise paid, may be paid from the individual shares in the tribal funds, when the same is available for distribution, in the discretion of the Secretary of the Interior.

That in addition to the construction charges every allottee, entryman, purchaser, or owner shall pay to the superintendent of the reservation a maintenance and operation charge based upon the total cost of maintenance and operation of the systems on the several reservations, and the Secretary of the Interior is hereby authorized to fix such maintenance and operation charge upon such basis as shall be equitable to the owners of the irrigable land. Such charges when collected shall be available for expenditure in the maintenance and operation of the systems on the reservation where collected: *Provided*, That delivery of water to any tract of land may be refused on account of nonpayment of any charges herein authorized, and the same may, in the discretion of the Secretary of the Interior, be collected by a suit for money owed: *Provided further*, That the rights of the United States heretofore acquired, to water for Indian lands referred to in the foregoing provision, namely, the Blackfeet, Fort Peck, and Flathead Reservation land, shall be continued in full force and effect until the Indian title to such land is extinguished.

That the Secretary of the Interior be, and he is hereby, authorized to prescribe such rules and regulations and issue such notices as may be necessary to carry into effect the provisions of this act, and he is hereby authorized and directed to determine the area of land on each reservation which may be irrigated from constructed ditches, and to determine what allowance, if any, shall be made for ditches constructed by individuals for the diversion and distribution of a partial or total water supply for allotted or surplus unallotted land: *Provided*, That if water be available prior to the announcement of the charge herein authorized, the Secretary of the Interior may furnish water to land under the systems on the said reservations, making a reasonable charge therefor, and such charges when collected may be used for construction or maintenance of the system through which such water shall have been furnished.

Act March 2, 1917 (39 Stat. 980): For continuing construction of the irrigation systems of the Blackfeet Indian Reservation, in Montana, $25,000 (reimbursable).

Act May 25, 1918 (40 Stat. 574): For continuing construction, maintenance, and operation of the irrigation systems on the Blackfeet Indian Reservation, in Montana, $50,000 (reimbursable).

Act June 30, 1919 (41 Stat. 16): For continuing construction, maintenance, and operation of the irrigation systems on the Blackfeet Indian Reservation, in Montana, $50,000 (reimbursable).

Act June 30, 1919 (41 Stat. 16): That so much of the Indian appropriation act of March 1, 1907 (34 Stat. 1015–1035), as relates to the disposal of surplus unallotted lands within the Blackfeet Indian Reservation, in Montana, is hereby repealed, and the Secretary of the Interior is authorized to make allotments under existing laws within the said reservation to any Indians of said Blackfeet Tribe not heretofore allotted, living six months after the approval of this act, and thereafter to pro-rate all unallotted and otherwise unreserved lands therein among the Indians who have been allotted or may be entitled to rights within said reservation: *Provided*, That of the lands so allotted 80 acres of each allotment shall be designated as a homestead by the allottee and be evidenced by a

trust patent and shall remain inalienable and nontaxable until Congress shall otherwise direct: *Provided further*, That the Blackfeet tribal rolls shall close six months after the approval of this act and thereafter no additional names shall be added to said rolls: *Provided*, That nothing herein shall be construed to repeal the grants of land made by the act of March 1, 1907, to religious institutions and to the State of Montana for school purposes, nor repeal the authority of the Secretary of the Interior to dispose of any land within said reservation suitable for town-site purposes, as provided by that act: *Provided*, That the State of Montana, in making indemnity school selections, shall be confined to nonmineral and nonirrigable lands: *Provided further*, That the provisions of the act of March 1, 1907, which require a division of the funds received from the sale of the surplus lands immediately upon the date of the approval of the allotments of land are hereby repealed: *Provided further*, That the lands within said reservation, whether allotted, unallotted, reserved, set aside for town-site purposes, granted to the State of Montana for school purposes, or otherwise disposed of, shall be subject to all the laws of the United States prohibiting the introduction of intoxicants into the Indian country until otherwise provided by Congress: *Provided further*, That any and all minerals, including coal, oil, and gas, are hereby reserved for the benefit of the Blackfeet Tribe of Indians until Congress shall otherwise direct, and patents hereafter issued shall contain a reservation accordingly: *Provided*, That the lands containing said minerals may be leased under such rules and regulations and upon such terms and conditions as the Secretary of the Interior may prescribe: *And provided further*, That allotments herein provided for shall be made under such rules and regulations as the said Secretary may prescribe, and trust patents shall be issued therefor as provided by the aforesaid act of March 1, 1907, except as to the homestead hereinbefore mentioned.

Act of February 14, 1920 (41 Stat. 408): For continuing construction, maintenance and operation of irrigation systems on the Blackfeet Indian Reservation, Mont., $25,000.

Act of March 3, 1921 (41 Stat. 1225): For the same purposes as set out in the act of February 14, 1920, supra, $30,000.

Act of May 24, 1922 (42 Stat. 559): For continuing construction, maintenance and operation of irrigation systems on the Blackfeet Reservation, Mont., $30,000.

Act of January 24, 1923 (42 Stat. 1174): For the same purposes as set forth in the act of May 24, 1922, supra, $60,000.

Act of June 5, 1924 (43 Stat. 390): For continuing construction, maintenance and operation of irrigation systems on the Blackfeet Reservation, Mont., $20,000.

Act of March 3, 1925 (43 Stat. 1146): For maintenance and operation of irrigation systems on the Blackfeet Reservation, Mont., $5,000.

Act of May 10, 1926 (44 Stat. 458): For improvements, maintenance and operation of Two Medicine and Badger-Fisher divisions of irrigation systems on the Blackfeet Indian Reservation, Mont., $15,000.

Act of January 12, 1927 (44 Stat. 934): For improvement, maintenance and operation of Two Medicine and Badger-Fisher divisions of irrigation systems on the Blackfeet Reservation, Mont., $15,000.

4. HISTORY

The Blackfeet Indian Reservation was originally a part of a much larger reservation embracing all of northern Montana that was established by Executive order of July 5, 1873, for the various Indian tribes then living in or near this region, including the Gros Ventre, Piegan, Blood, Blackfeet, River Crows, and other Indians. The limits of this extensive reservation were described in the Executive order as follows:

"Commencing at the northwest corner of the Territory of Dakota, being the intersection of the forty-ninth parallel of north latitude and the one-hundredth and fourth meridian of west longitude; thence south to the south bank of the Missouri River; thence up and along the south bank of said river to a point opposite the mouth of Medicine or Sun River; thence in a westerly direction, following the south bank of said Medicine or Sun River as far as practicable, to the summit of the main chain of the Rocky Mountains; thence along said summit in a northerly direction to the north boundary of Montana; thence along said north boundary to the place of beginning, excepting and reserving therefrom existing military reservations."

By various subsequent agreements, Executive orders, and acts of Congress, the Fort Peck, Fort Belknap, and Blackfeet Reservations were segregated from this area, and the intervening lands were made a part of the public domain.

By act of Congress of June 10, 1896 (29 Stat. 354), ratifying an agreement with the Indians of the Blackfeet Reservation, they ceded to the United States the western part of their reservation (a very mountainous country) and this is now embraced in Glacier National Park. In consideration of this cession of land, the Indians received $1,500,000, to be advanced or expended for their benefit, including the purchase of livestock, agricultural implements, education of their children, etc., and irrigating their farms.

The Blackfeet Reservation is situated in the northern part of Montana immediately south of the United States-Canadian boundary line, and extends south from the line for a distance of about 60 miles. The western boundary originally was the continental divide of the Rocky Mountains, but the western portion of the reservation was ceded to the Government and is now embraced in Glacier Park.

The first reference concerning irrigation on the Blackfeet Reservation that we find in the files of the Indian Office is contained in a letter accompanying the report of August 20, 1902, of the then chief inspector of irrigation, W. H. Code, to the Secretary of the Interior. In this letter mention is made of several ditches at that time existing, and some of which apparently had been built by individual effort and some by the Government, presumably under the supervision of the agency or reservation officials. It is stated:

"The ditches on this reservation are of two kinds, some of them large and public in character, a great number of ranchers using water from each ditch. Others are small, and only used by one or two ranchers. Of the larger ditches there are three, the Willow Creek, Mission, and the Joe Tatsey Ditch. The Willow Creek Ditch is used by the school, the Agency, and the Congregational Mission, and a large number of ranchers, including Joe Kick, a half-breed, below Blackfoot. The Mission Ditch is used more and more each year, and is making the Two Medicine Valley a veritable farmers' paradise. The Catholic Mission raises over 100 bushels of oats per measured acre, and they, as well as Bear Chief, John Gobert, and Big Lake, and others, raise an immense quantity of the finest timothy hay; also all kinds of root crops that grow here, such as cabbage, turnips, potatoes, etc."

In his report of August 20, 1903, Mr. Code describes two of the Indian councils which he attended on invitation of the Indians. At the first of the councils, it is stated:

"The sentiment was strongly against the proposed canal system * * * and it could easily be seen that the general sense of the meeting was not favorable to irrigation on any part of the reservation, at least at that time. There were some 17 speeches made, out of which there were only four who favored resuming the work, the great majority being adverse to having tribal funds so invested. * * * In this council the Indians contended that the Blackfeet Reservation was simply a grazing country and sufficient wild hay could be put up each year for winter feed.

"At the second smaller council called by Bear Chief and his followers, the sentiment was strongly in favor of continuing the construction, as many of the Indians were anxious to work and felt that unless ditch construction was resumed, they would either go hungry or be compelled to sell their stock."

Further, Mr. Code states:

"The consensus of opinion being that norwithstanding the unfavorable physical conditions which prevail on this reservation, sufficient crops can be grown annually to warrant the modest expenditure of approximately $4 per acre in irrigation structures."

Continuing, Mr. Code states:

"White settlers living east of the reservation have already attempted to obtain this water, as will be noted by reference to report of the Indian Commissioner for 1902, page 64. The privilege of entering the reservation for the purpose of taking out a canal to irrigate private lands outside the reservation was denied said settlers on the ground that the water of Cut Bank Creek would be needed to irrigate Indian lands. With the influx of settlers into northern Montana consequent upon the starting of the proposed Milk River project, under the national reclamation act, unappropriated waters will be eagerly sought after, and if the Indians do not soon make some use of the waters which now waste idly through the reservation, they will in the course of a comparatively few years find that they have

allowed a most valuable asset to slip away from them into the hands of the whites. This water is needed, for no permanent and enduring prosperity can be assured the Indians without agriculture. * * * Last winter the Indians lost many cattle owing to an insufficient supply of hay which was very scarce all over northern Montana, reaching a price of over $20 per ton."

Among other reasons advanced for the construction of irrigation works, Mr. Code says:

"It is necessary that these Indians should be supplied with work at an early date in order to be in better condition to face the winter; as I understand it, unless some such work is furnished them, the agent will be compelled to adopt some other measures for their support. The expenditure of the additional money as herein recommended will relieve them to a large extent."

During the years 1903 to 1905, what is known as the Cut Bank Indian Ditch was completed. So far as could be learned this ditch was never used to any considerable extent, the Indians claiming that much of the land is so gravelly and rocky that it can not be cultivated.

Under an agreement entered into March 8, 1907, between the Commissioner of Indian Affairs, and the Director of the Reclamation Service, there was adopted a plan for cooperation between the Office of Indian Affairs in control of the appropriations, and the Reclamation Service, to be in direct charge of the work. The investigations and construction of the irrigation system on the Blackfeet Reservation were thus placed in charge of the Reclamation Service.

This understanding or informal agreement between the Reclamation Service and the Bureau of Indian Affairs was entered into at the instance of the Commissioner of Indian Affairs, and provided that the Reclamation Service should build "those irrigation projects into which both white and Indian interests enter." This agreement involved the Fort Peck, Blackfeet, and Flathead Reservation projects in Montana.

The Acting Secretary of the Interior in a letter dated June 28, 1907, to the Director of the Reclamation Service states:

"I inclose herewith a report by Chief Engineer W. H. Code (chief irrigation engineer, Bureau of Indian Affairs), dated the 13th instant, in which for reasons stated he recommends that the Reclamation Service undertake surveys and investigations and subsequently superintend the construction of such canals as deemed advisable to build on the Blackfeet Reservation for the irrigation of Indian allotments. The Acting Commissioner of Indian Affairs in his communication of the 26th instant, herewith inclosed, concurs in this recommendation. Kindly advise me if there is any reason why the Reclamation Service may not undertake this work and, if there is none, consider this authority to proceed in accordance with the recommendation of Mr. Code and the Acting Commissioner."

Following the act of March 1, 1907, making available $100,000 for the construction of irrigation systems on the Blackfeet Indian Reservation, Mont., and on the recommendation of the chief irrigation engineer of the Indian Service, approved by the Secretary of the Interior, entrusting the construction of the irrigation works to the Reclamation Service, engineers of the Indian Service and the Reclamation Service, in July, 1907, made a preliminary reconnaissance of the reservation and outlined the scope of and the plan for preliminary investigations and irrigation surveys. Actual field work on surveys was begun by the Reclamation Service August 21, 1907.

In the annual report of the Commissioner of Indian Affairs dated September 30, 1907, page 9, it is stated:

"I am turning over to the Reclamation Service those projects under my jurisdiction which involve a possible conflict between the interests of the Indians and those of white settlers in the neighborhood of Indian reservations * * *."

Construction work on the Blackfeet project was begun by the Reclamation Service in July, 1908. During the period of construction it appears that there was but little attention given the work by the Indian Service. During the summer of 1914, however, there was an investigation by a commission appointed by the Commissioner of Indian Affairs "to investigate irrigation projects on Indian lands in the three northern districts." This commission reported under date of September 4, 1914, to the Commissioner of Indian Affairs, and this report was published as House Document 1215, Sixty-third Congress, third session. The report treats of the Fort Peck, Blackfeet, and Flathead Reservation projects, and the members of this commission were Reservation Superintendents C. B. Lohmiller, A. P. McFatridge, and Fred C. Morgan, and Superintendents

of Irrigation W. S. Hanna, L. M. Holt, and Henry W. Dietz. In this report the importance of prosecuting the work in order to protect the water rights of the Indians is pointed out. The following are excerpts from the report:

"Lands lying south and east of the project, adjacent to the boundary line of this reservation, that have been homesteaded and plowed, have in many instances been deserted, giving place to obnoxious weeds, which have taken the place of native grass, much to the detriment of range conditions.

"The members of the commission realize that the Blackfeet Reservation has been in the past wholly a stock-raising country and probably the greater portion should remain the same in the future. We believe that it is highly essential that the Indian retain possession of his irrigable land and be permitted to lease it if he so desires in order that the water right to the land may be perfected by beneficial use. We do not believe that this locality will at any time in the near future become an entirely successful country for diversified farming, either dry land or irrigated, but it is our opinion that in any ordinary season a fairly good crop of hay may be grown on the irrigation land covered by the constructed and proposed irrigation works."

In May of 1917, Asst. Chief Engineer F. R. Schanck, of the Indian Service, inspected the Blackfeet Reservation project as a member of a board of engineers, the other members of the board being Senior Engineer C. P. Williams and Project Manager Snell of the Reclamation Service. This board of engineers was convened for the purpose of formulating a program of the construction work to be undertaken with the funds then available, and to make recommendations with reference to the conduct of the work to be done with future appropriations.

The work on the Blackfeet project was continued under the Reclamation Service until March of 1924, when it was transferred to the Indian irrigation service.

5. LOCATON, TRANSPORTATION, AND MARKETS

Counties.—Glacier and Pondera.

Townships.—Nos. 28 to 37; R. 5 to 15 W. P. M. M.

Railroads.—Great Northern Railway from Cutbank west to Glacier Park boundary, a distance of 50 miles, is within the reservations. Towns and shipping points on the Great Northern are Browning, Blackfoot, Sundance, Spotted Robe, Glacier Park. Town of Valier, 10 miles south of reservation, south boundary, on Montana Western Railway, is the shipping point for the Badger-Fisher unit.

Highways and roads.—Park to Park (Yellowstone to Glacier) Highway graded and graveled from north to south through reservation for 70 miles. Roosevelt Highway graded and graveled from Cutbank at east boundary to Glacier Park or west boundary.

Railway towns and stations.—Browning (population, 1,000), Blackfoot, Sundance, Gunsight, Spotted Robe.

Other towns or post offices.—Babb, Family, Heart Butte. Makets, Eastern, Western, and local.

The Indian agency, and the irrigation project offices are at Browning, a short distance from Fort Browning on the Great Northern Railway.

6. AREA AND CLASSIFICATION OF RESERVATION LANDS

Area of reservation (1927), 1,421,745.25 acres.

(*a*) *Area, classification, and approximate value of individual Indian and tribal lands*

Classification	Acres	Per acre value	Total value
Irrigated	21,337	$50	$1,066,850
Under canal, not irrigated	23,163	10	23,160
Irrigated by proposed works	63,000	5	315,000
Timberland	1,314,245	3	3,943,000
Total	1,421,745		5,348,010

(*b*) *Allotments.*—From 1907 to 1920 a total area of 400 acres (280 acres grazing land, 40 acres irrigable, 80 acres homestead—usually grazing land) was allotted to each member of the tribe, regardless of age or sex. The allotment roll was

closed in 1920; 2,580 allotments, total area 1,169,154 acres, are now under trust patent; 842 homestead allotments of 80 acres each—262,600 acres—are held under fee patent; 74 deceased Indian allotments have been sold to date. Approximately 600 Indians have disposed of their original allotments, but still retain their homestead allotment of 80 acres, which is under trust patent.

7. POPULATION AND HEALTH CONDITIONS

(*a*) *Indians.*—Population of reservation: 1925, 3,244; 1927, 3,375.
Indian tribes: Blackfeet, Piegans, and Bloods.
Indians: Full blood, 1,104; mixed, 2,271.
Indians living in permanent homes: All.
Cases of tuberculosis, 340; trachoma, 96.
Indian births: 1925, 83; 1927, 169. Deaths: 1925, 37; 1927, 79.
Indians receiving rations, 330.
(*b*) *Whites.*—Population: 1925, 1,000; 1927, 1,000.

8. CLIMATE

Period covered by reliable records: Cut Bank, 1903 to 1920.
Range in elevation of irrigable area: 3,800 to 4,000 feet.
Maximum temperature, 99°; minimum temperature, 46° below zero.
Average annual precipitation: 11.75 inches.
Average date last killing frost (spring): June 3.
Average date first killing frost (fall): September 19.
Average growing season: 90 to 110 days.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(*a*) *Topography.*—A topographical survey of the irrigable area was made 1909–1913 by the United States Reclamation Service. The maps (scale 1 inch to 400 feet, with 5-foot contour interval) are at the project office and are in good condition. The average slope of the irrigable area is 10 feet per mile; maximum slope 25 feet, and minimum slope 5 feet, per mile.

About three-fourths of the irrigable area is of uniform slope, and the remainder is rough and broken, with isolated ridges, knolls or depressions, making irrigation difficult and expensive.

The cost of clearing, plowing, leveling, and ditching the smoothest lands of the irrigable is $10 per acre; the roughest, $20; and the average $12 per acre.

(*b*) *Soil.*—No soil survey has been made on this project. The soil varies from light sandy loam to heavy gravel shot loam in all parts of the project, and varies from 1 foot to 10 feet in depth. The subsoil is generally of a loose gravelly nature permitting good drainage. Native vegetation is what is known as native bluejoint grass. The average crop return on irrigated cultivated land is approximately $20 per acre. None of the project lands are affected with alkali, nor have any once-productive lands been affected by seepage. No drainage work has been necessary.

(*c*) *Irrigation methods and water deliveries.*—The wild flooding methods of irrigation from seasonal ditches is followed entirely. Water is delivered in heads of 2.5 second-feet for each 160 acres or fraction thereof.

(*d*) *Duty of water.*—An average of 1 acre-foot of water per acre is used.

(*e*) *Principal crops and average yields.*—Alfalfa, 2 tons; barley, 20 bushels; oats, 30 bushels; wheat, 15 bushels; native hay, 1½ tons.

10. WATER SUPPLY AND WATER RIGHTS

(*a*) *Stream-flow*

	Drainage area		Discharge at diversion	
	Square miles	Elevation	Maximum	Minimum
Cut Bank	270	6,700	8,150	44
Two Medicine	370	6,700	19,000	50
Badger Creek	230	6,700	3,220	115
Birch Creek	155	6,700	3,820	80

(*b*) *Reservoirs.*—Two Medicine Reservoir was built in 1911 to 1913, and has a capacity of 16,000 acre-feet. It has been used to a capacity of approximately 4,000 acre-feet, due to the interference of Glacier Park highway to Two Medicine Chalets which has been maintained through the reservoir site. However, a new highway, above the flowage area has been constructed, and the reservoir can now be utilized to its full capacity.

Four Horne Reservoir was built in 1914 and 1915 and has an ultimate capacity of 30,000 acre-feet. However, temporary controlling works were installed, which limit the capacity to 4,000 acre-feet, which amount has been stored annually since 1919.

(C) PROJECT DIVERSIONS

	1924	1925	1926
Two Medicine unit:			
Acre-feet for season	9,421	9,841	13,023
Acres irrigated	617	1,612	2,089
Acre-feet per acre	15.27	6.10	6.44
Average second-feet—			
May	336	1,334	1,921
June	492	2,580	3,498
July	3,314	3,397	3,646
August	2,802	1,840	2,690
September	1,614	690	1,268
Badger-Fisher unit:			
Acre-feet for season	6,040	6,933	9,064
Acres irrigated	3,088	4,043	4,630
Acre-feet per acre	1.95	1.73	1.96
Average second-feet—			
May	730	467	1,202
June	740	1,487	3,121
July	2,868	3,681	3,626
August	824	862	1,115
September	446	496	----------
Birch Creek unit:			
Acre-feet for season	342	715	902
Acres irrigated	234	304	337
Acre-feet per acre	1.46	2.35	2.67
Average second-feet—			
May	----------	101	81
June	----------	108	208
July	100	460	297
August	180	46	316
Piegan unit:			
Acre-feet for season	164	205	336
Acres irrigated	60	60	94
Acre-feet per acre	2.73	3.41	3.58

(*d*) *Water rights.*—Act of March 1, 1907, Public No. 154:

"That the Indians and the settlers on the surplus lands, in the order named, shall have preference right for one year from the date of the President's proclamation opening the reservation to settlement, to appropriate the waters of the reservation, which shall be filed on and appropriated under the laws of the State of Montana, by the Commissioner of Indian Affairs on behalf of the Indians taking irrigable allotments, and by the settlers under the same law."

As all irrigable land was allotted, the United States filings were acknowledged on May 7, 1910, and notices are recorded every third year, where construction has not been begun, on the streams of the reservation.

The Federal Court of Helena, Mont., in June, 1907, sustained the claim of the Government and decreed to the United States, for the use of the Indians, 1,666 inches of water, or 41.6 cubic feet per second, from Birch Creek, and as much more water of Birch Creek as might be required for the use of the Indians.

An act of Congress, approved February 26, 1923 (42 Stat., Public, 444, 67th Cong.), authorized the Secretary of the Interior to enter into an agreements with the Toole County irrigation district of Shelby, Mont., and the Cut Bank irrigation district of Cut Bank, Mont., and thereby fix the extent of the prior right of the Indians to the waters of Two Medicine River, Cut Bank, and Badger Creeks.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

(*a*) *General plan.*—Proposed Cut Bank south unit: Divert flood water from the south bank of Cut Bank Creek, through a feeder canal to Cuardipee Reservoir, a natural depression, thence to 18,000 acres near the stations of Carlow and

Seville on the Great Northern Railway. No work has been done on this unit. Estimated cost completed, $446,850.

Proposed Cut Bank north unit.—Divert water from the north bank of Cut Bank Creek directly to 9,000 acres lying north of Cut Bank Creek and west of the east boundary of the reservation. No work has been done on this unit. Estimated cost to complete, $197,200.00.

Badger-Fisher Unit.—Diverting water from the south bank of Badger Creek, supplying water through the feeder canal to Four Horns Reservoir and through Fisher Canal to 30,000 acres. One hundred second-feet feeder canal with 4,000 acre feet storage in Four Horns Reservoir, supplies water via a 16,000 acre distributing system to 9,649 acres on Fisher Flats, being located in the junction of Birch Creek and Two Medicine River. Cost to date, $473,943.16; estimate to complete, $411,023; estimated cost when completed, $884,516.16.

Two Medicine unit.—Diverting water from the north bank of Two Medicine River, being supplemented by the Two Medicine Reservoir of 16,000 acre-feet capacity, to 30,000 acres under main canal, and 14,000 acres under proposed South Branch canal from proposed Spring Lake Reservoir. Two Medicine Reservoir, of 16,000 acre-feet capacity, is built. Two Medicine main canal of 100 second-feet capacity delivers water through a 24,000 acre main canal distributing system to 7,188 acres on the south side of Cut Bank Creek, along the Great Northern Railway, just west of the town of Cut Bank. Cost to date, $571,366.36; estimated cost to complete, $1,183,138; total estimated cost when completed, $1,754,494.36. No work has been done on the South Branch canal, except surveys and testpits to the extent of $1,930.80.

Birch Creek unit.—Diverting water from the north bank of Birch Creek direct to 3,500 acres. Canal and laterals have been built to serve 2,258 acres; additional laterals and structures are necessary to serve full acreage. Cost to date, $23,736.53; estimate to complete, $8,555; total estimated cost when complete, $32,291.42.

Piegan unit.—Diverting water from the south bank of Badger Creek, directly to 3,000 acres lying on both sides of the Park to Park Highway, 20 miles southeast of Browning, and just south of Badger Creek. Canals and laterals have been constructed to serve 2,242 acres; additional laterals and structures are needed to complete. Cost to date, $20,238.78; estimate to complete, $11,313; total estimated cost when completed, $31,551.78.

(*b*) *Divisions of project*

Unit	Proposed irrigable	Present irrigable	Total irrigated (1926)
Cut Bank, south	18,000		
Cut Bank, north	9,000		
Badger Fisher	30,000	9,649	4,630
Two Medicine	44,000	7,186	2,089
Birch Creek	3,500	2,258	337
Piegan	3,000	2,242	94
Total	107,500	21,337	7,150

12. SUMMARY OF PROJECT WORKS

(*a*) *Storage reservoirs.*—There are two storage reservoirs: The Two Medicine, capacity 16,000 acre-feet; and the Four Horns, capacity 4,000 acre-feet.

(*b*) *Storage dams.*—There are two storage dams, the aggregate volume being 2,370 cubic yards of masonry and 38,941 cubic yards earth fill.

(*c*) *Distributary structures.*—There is one masonry diversion dam, volume 290 cubic yards.

Canal structures: Costing over $2,000 each—17 concrete, 2 wood; costing $500 to $2,000—7 concrete, 2 wood; costing $100 to $500—70 concrete, 25 wood; costing less than $100—132 concrete, 1,324 wood.

Bridges, 58; culverts, 151; concrete pipe, 8,563 feet; metal pipe, 1,462 feet; wood pipe, 1,030 feet.

Flumes: 3 steel, sizes 2, 5, and 8 feet—total length, 1,216 feet; 4 wood, sizes 4 to 8 feet—total length, 691 feet.

Buildings: 1 office, 7 residences, 5 barns; total cost $16,792.

(*d*) *Irrigation canals and laterals*

Capacity:	Miles
250 to 500 second-feet	3.8
100 to 250 second-feet	84.6
15 to 50 second-feet	104.0
Less than 15 second-feet	170.0
Total	362.4

(*e*) *Drains.*—None.

(*f*) *Project telephone system.*—Miles of telephone line, 140; telephone stations, 11.

(*g*) *Individual Indian ditches.*—In 1886 a small ditch of 3 to 4 miles in length was built by the ranchers living along Birch Creek to irrigate some 1,000 acres of land along Birch Creek. It was improved in 1902 by the Government to carry 5 second-feet. The improvements were not kept up, and the ditch was taken into the Birch Creek unit of Blackfeet project and those families that had received benefit from the original ditch were given a decreed water right. This decreed water right covers approximately 800 acres. In 1905 a canal was taken out of the north fork of Cut Bank Creek by the Government to irrigate bench lands between Cut Bank and Greaswood Creeks; capacity at head, 161 second-feet; extends approximately 7 miles. This canal has never been utilized.

In 1892 the Holy Family Mission built a ditch taking out from the north side of Two Medicine River about 2 miles above their buildings to irrigate 250 acres of their allotment. This ditch was operated until Two Medicine Canal was built, after which they received service from that system. The mission has received service without reimbursing the Government, pending a decision as to their right.

There have been numerous other small ditches built by Indians and white men for Indian families at their own expense and with help from the Government, concerning which there is no available data. Few, if any, of these ditches are now being used.

13. AREA AND UTILIZATION OF ARABLE AND IRRIGABLE LANDS

(*a*) *Utilization of Government project lands*

Entire project	1924	1925	1926
1. Acreage arable [1]	107,500	107,500	107,500
2. Acreage irrigable [2]	21,337	21,337	21,337
3. Acreage irrigated	4,048	6,019	7,150
4. Acreage cultivated			6,712
5. Total crop value		$121,192.00	$102,225.00
6. Average crop value (acre)		$19.75	$16.47
7. Indians farming	28	19	10
8. Lessees farming	23	16	25
9. White owners farming	18	33	46
10. Under canal but dry-farmed	3,088	1,486	1,986

[1] Acreage arable; ultimate irrigable acreage when project is completed.
[2] Acreage irrigable; now under constructed works.

(*b*) *Utilization of land owned by Indians and not leased (Government project)*

Farmed by Indians	1924	1925	1926
1. Acreage arable			80,600
2. Acreage irrigable		13,601	13,601
3. Acreage irrigated	306	163	45
4. Acreage cultivated			45
5. Families farming	28	19	10
6. Cultivated per family			4.5
7. Total crop value		$2,881.50	$882.00
8. Crop value (acre)		$17.67	$19.82
9. Crop value (family)			$88.20

(c) *Utilization of land owned by Indians and leased (Government project)*

Farmed by lessees	1924	1925	1926
1. Acreage irrigated	1,720	2,751	3,891
2. Acreage cultivated			
3. Number of lessees	23	16	25
4. Total crop value		$44,727.00	$45,215.00
5. Crop value (acre)		$16.26	$11.50

14. PRINCIPAL CROPS, CROP YIELDS, AND RETURNS

(a) *Detailed crop data, project lands irrigated (1926)*

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre	Total value
Indian farmers:					
Alfalfa hay	40	1.7 tons	$12.00	$19.80	$792.00
Garden	1			100.00	50.00
Hay	4	1 ton	10.00	10.00	40.00
Total	45			19.82	882.00
White farmers—owners and lessees:					
Alfalfa hay	1,109	1.88 tons	12.00	22.50	24,948.00
Barley	183	17.15 bushels	.60	10.29	1,884.00
Clover hay	47	1.68 tons	12.00	20.21	960.00
Garden	12			182.24	2,284.00
Hay	835	1.04 tons	10.00	10.46	8,745.00
Oats	465	22.2 bushels	.65	14.46	6,720.35
Pasture	439			6.41	2,815.00
Peas	40		3.75	6.56	262.50
Wheat	3,874	13.38 bushels	1.00	13.38	51,855.00
Miscellaneous	17			45.29	770.00
Total	7,103			14.41	101,243.85

The majority of the farmers on this project are inexperienced in irrigation farming. They use water as an insurance against loss by drought, rather than to produce a maximum crop. The few farmers who utilize irrigation water probably average 100 per cent more production than the project average.

(b) *Crop values for project lands not irrigated but dry farmed (1926)*

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre	Total value
Alfalfa hay	10	1 ton	$12.00	$12.00	$120.00
Barley	9	16.6 bushels	.60	10.00	90.00
Flax	10	5 bushels	2.00	10.00	100.00
Garden	2			83.55	188.00
Hay	178	Six-tenths of 1 ton	10.00	6.29	1,120.00
Oats	37	5 bushels	.65	3.02	111.80
Wheat	1,650	8 bushels	1.10	8.88	14,663.00
Total	1,896			8.64	16,392.80

15. ECONOMIC CONDITIONS AMONG PROJECT FARMERS (INDIANS)

	1924	1925	1926
Number of Indian farms	(1)	(1)	10
Indian families farming	(1)	(1)	10
Livestock:			
Horses	(1)	(1)	65
Cattle, dairy	(1)	(1)	9
Sheep	(1)	(1)	375
Estimated value of livestock per farm	(1)	(1)	$573.00
Equipment:			
Plows	(1)	(1)	10
Mowers	(1)	(1)	5
Automobiles	(1)	(1)	2
Estimated value of equipment per farm	(1)	(1)	$100.00
Acreage irrigated by Indians	(1)	(1)	45
Acreage irrigated per family	(1)	(1)	4.5
Average crop value per acre	(1)	(1)	$19.82
Average crop value per family	(1)	(1)	$88.20
Per acre construction assessment against Indians	$0.50	$0.50	$0.50
Per acre operation and maintenance assessment against Indians	(2)	(2)	$1.00
Acres of Indian land leased:			
Irrigated	(1)	(1)	20,000
Not irrigated	(1)	(1)	
Average rental per acre:			
Irrigated (plus irrigation charges)	$0.50	$0.50	$0.50
Not irrigated, farm land	$0.50	$0.50	$0.50
Not irrigated, grazing	$0.10	$0.10	$0.10
Indian land sold:			
Irrigable	(1)	(1)	(1)
Not irrigable	(1)	(1)	(1)
Average sale price per acre:			
Irrigable	$8.00	$8.00	$8.00
Not irrigable	$3.00	$3.00	$3.00
Approximate sale price (for the 3 years)			$11,662.78
Number of Indians receiving payments from agricultural and grazing leases, timber, oil, power, etc	2,800	2,800	2,800
Average per capita payments from above sources	$35.00	$35.00	$35.00
Total payments to Indians from above sources	$100,000.00	$100,000.00	$100,000.00
Indians' reimbursable indebtedness	$15,000.00	$15,000.00	$15,000.00
Amount paid on reimbursable indebtedness	$5,000.00	$5,000.00	$5,000.00
Number of Indians receiving rations	400	350	330
Indian tribal fund (amount)			$7,000.00
Source of tribal fund	(3)	(3)	(3)

[1] Data not available.
[2] 75 cents per acre applied for.
[3] Agricultural, grazing, and oil leases and miscellaneous sales.

16. PROJECT OPERATION AND MAINTENANCE

(*a*) *Organization.*—Superintendent of construction, $2,700 less $300 for quarters, fuel, and light.

Clerk, $2,100 less $240 for quarters, fuel, and light.

Water master, $2,100; no quarters furnished; supplied with Government-owned car, operated at Government expense.

Water master, $1,860 less $180 for quarters, fuel, and light; supplied with Government-owned car, operated at Government expense.

Motor truck driver and mechanic, $1,500 less $180 for quarters, fuel, and lights.

Ditch riders, 4; one at $1,620 less $180 for quarters, fuel, and light; 3 at $1,320 less $180 for quarters, fuel, and light.

(*b*) *Annual expenses.*—

Concrete structure	$250
Wooden structure	3,000
Metallic structure	50
Raising banks	200
Channel protection	500
Cleaning canals	3,000
Repairing breaks	200
Water deliveries	5,000
Canal patrol	2,000
	14,200

(c) Comparison with neighboring projects, either Government, corporate, or private

	Blackfeet project	Valier project, a corporation
Elevation	3,800 feet	3,800 feet.
Growing season	130 days	131 days.
Soil	Light to heavy loam	Heavy loam.
Water supply	Rights of reservation pending decision.	Stream and storage 160,000 acre-feet.
Water service	Delivery on 48 hours' notice.	Delivery on 48 hours' notice.
Crops grown	Grain and hay	Dairy, grain, hay, and beets.
Per acre crop value (1926)	$14.75	$18.73.
Quality of construction	75 per cent wood construction.	Concrete and wood.
Total construction cost to date per acre	$51.24	$50.[1]
Annual per acre construction assessment	$0.50	
Annual per acre operation and maintenance assessment	$1	$1.
Per cent of irrigable land cultivated in 1926	50 per cent	85 per cent.

[1] Sale price of land with water right, $60.

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(a) Construction cost and collections to June 30, 1927

Total project construction costs to June 30, 1927 (all construction costs are from reimbursing appropriations)	$1,094,653.89
Total assessments	64,008.93
Total collections	14,412.73
Total delinquencies	49,596.20

(b) Collection of construction cost.—It is reported that assessments on construction cost are being made and collected, where possible, against all lands under constructed works, as per order of the Secretary of the Interior dated November 29, 1920 (41 Stat. 409). The rate of assessment is 50 cents per irrigable acre, and assessments were begun in 1920 on all lands regardless of ownership, except certain lands in Birch Creek unit, which have a decreed water right. These are lands formerly served from an old ditch that was taken over and improved to form a part of the present Birch Creek system.

(c) Operation and maintenance cost to June 30, 1927

Reimbursable moneys expended	$198,615.90
Maintenance collections, by reclamation service	37,742.00
Maintenance collections by Indian Service	20,022.27
Total operation and maintenance cost	256,380.17

(d) Operation and maintenance collections to June 30, 1927

Total assessments	$80,162.37
Total collections	59,769.52
Total delinquencies	20,392.85

	1924	1925	1926
Operation and maintenance cost	$12,492.37	$20,490.70	$18,472.66
Operation and maintenance collections:			
On Indian land not leased		388.94	120.89
On Indian land leased	1,521.25	3,688.28	4,030.30
On white-owned land	1,169.95	3,977.99	3,356.40
Total collections	2,691.20	8,055.21	7,517.59
Total delinquencies	9,801.17	12,435.49	10,955.07
Total delinquency for 5-year period 1924–1926 inclusive			33,191.73

Rate of penalty on operation and maintenance delinquencies: 6 per cent interest per annum from Jan. 1 following irrigation season, to date of payment.

It is reported that an annual assessment of $1 per acre for operation and maintenance against each acre that can be served from constructed works is made as per order of the Secretary of the Interior under date of April 27, 1926. Assessments are made during the current year and are due December 31 of that year for the water delivered during the preceding season. It is stated that an interest penalty at 6 per cent per annum and nondelivery of water are used to enforce collections. It is reported by the project engineer that an effort is made to collect operation and maintenance charges on white-owned land, Indian-owned land leased, and Indian-owned land not leased if farmed. Apparently from the record of operation and maintenance costs and collections for the past three years, as given in the preceding tabulation, efforts to collect are not entirely successful.

TWO MEDICINE DIVISION

(*a*) *Construction cost and collections to June 30, 1927*

Construction cost to date	$571, 356. 36
Estimated cost to complete (44,000 acres)	1, 183, 138. 00
Present cost per acre for 7,187.7 acres	79. 49
Estimated per acre cost when completed	40. 00–60. 00
Per-acre value of land without irrigation	5. 00–10. 00
Per-acre value of land when irrigated	25. 00–50. 00
Increase in value by irrigation	20. 00–45. 00
Total construction assessments to date	22, 274. 85
Total construction collections to date	5, 445. 05
Total delinquent construction to date	16, 829. 80

(*b*) *Operation and maintenance cost and collections to June 30, 1927*

Total operation and maintenance cost to date	$131, 026. 38
Total operation and maintenance assessments to date	29, 054. 39
Total operation and maintenance collections to date	19, 923. 23
Total operation and maintenance delinquencies to date	9, 131. 16

PIEGAN DIVISION

(*a*) *Construction cost and collections to June 30, 1927*

Construction cost to date	$20, 238. 78
Estimated cost to complete (3,000 acres)	31, 551. 78
Present cost per acre for 2,242 acres	9. 03
Estimated per-acre cost when completed	10. 00–20. 00
Per-acre value of land when irrigated	15. 00–20. 00
Total construction assessments to date	6, 651. 25
Total construction collections to date	613. 75
Total construction delinquencies to date	6, 037. 50

(*b*) *Operation and maintenance cost and collections to June 30, 1927*

Total operation and maintenance cost to date	$1, 459. 15
Total operation and maintenance assessments to date	2, 559. 25
Total operation and maintenance collections to date	540. 54
Total operation and maintenance delinquencies to date	2, 018. 71

BIRCH CREEK DIVISION

(*a*) *Construction cost and collections to June 30, 1927*

Construction cost to date	$23, 736. 53
Estimated cost to complete (3,500 acres)	32, 291. 53
Present cost per acre for 2,258 acres	10. 51
Estimated per-acre cost when completed	10. 00–25. 00
Per-acre value of land without irrigation	10. 00
Per-acre value of land when irrigated	20. 00–30. 00
Total construction assessments to date	4, 397. 00
Total construction collections to date	247. 50
Total construction delinquencies to date	4, 149. 50

(b) Operation and maintenance cost and collections to June 30, 1927

Total operation and maintenance cost to date	$7,213.27
Total operation and maintenance assessments to date	4,620.67
Total operation and maintenance collections to date	2,214.67
Total operation and maintenance delinquencies to date	2,406.00

BADGER-FISHER DIVISION

(a) Construction cost and collections to June 30, 1927

Total construction cost to date	$473,493.01
Estimated cost to complete (30,000 acres)	884,516.61
Present cost per acre for 9,649 acres	49.60
Estimated per-acre cost when completed	30.00–50.00
Per-acre value of land without irrigation	10.70
Per-acre value of land when irrigated	20.00–50.02
Total construction assessments to date	30,532.05
Total construction collections to date	7,922.75
Total construction delinquencies to date	22,609.50

(b) Operation and maintenance cost and collections to June 30, 1927

Total operation and maintenance cost to date	$116,046.51
Total operation and maintenance collections to date	35,935.52
Total operation and maintenance delinquencies	7,229.99

18. PROJECT DEFECTS, PROBLEMS, AND COMPLAINTS

Climatic conditions.—It is the opinion of the advisers that the Blackfeet Reservation project represents an attempt to transform a region restricted by its climatic conditions to a grazing country into an irrigated agricultural community. We do not believe the project can ever be a success, at least under present economic conditions, or even under economic conditions as favorable as any that have existed since the inception of the project. As an Indian project it is, in our opinion, a hopeless failure. After an expenditure of $1,250,000 we find that in 1926 the Indians were irrigating only 45 acres of the project land, from which they produced crops estimated by the project engineer to be worth $882. Accepting this as correct, which, however, we doubt, the 10 Indian families farming received $88 each for their season's activities. The operation and maintenance deficit that year—that is, the excess of expenditures over receipts—was $10,955, so that it actually cost the Government nearly $11,000, or over $1,000 to enable each of these 10 Indian families to farm on the irrigation project.

Man has demonstrated that he can overcome aridity, but his efforts to modify climate are expensive and not always attended with success. The winters here are long and severe, with temperatures frequently ranging from 30° to 50° below zero. The summers sometimes are so only in name. Frosts may and not infrequently do occur any month in the summer. One of the annual reports states: "Winter weather continued until about May 1, and the latter part of May was cold and wet, so that little seeding was done until after June 1. No water was used for irrigation before July 1."

The most that can be said of those responsible for the initiation of this project is that the project had its inception in the so-called boom days of western land reclamation, when numerous projects destined to be failures were constructed, both by the Government and by corporations or private individuals. This project apparently was adopted without much consideration as to the climatic conditions.

Agricultural conditions.—The most serious problem in connection with the Blackfeet project is the failure to utilize the land provided with irrigation facilities. Owners and lessees are making but little use of the land, practically all of the farming being done in a very desultory and haphazard manner. The Indians themselves are making practically no use whatever of the irrigable lands on the Government project. During the season of 1926, with an area of 21,377 acres irrigable from constructed works, only 7,150 acres, or practically one-third of the irrigable area, were actually irrigated. Of this, the Indians, only 10 of whom farmed, irrigated 45 acres. The area irrigated by Indians consisted of 40 acres of alfalfa, 4 acres of wild hay, and 1 acre of garden.

From the following table it will be noted that, while it is true there has been a gradual increase in the total irrigated area for the past three years, the area irrigated by the Indians has rapidly decreased, the increase in the total being the result of slightly increasing activity on the part of lessees and white owners.

	1924	1925	1926
Irrigated by Indians	306	226	45
Irrigated by lessees	2,421	3,293	3,891
Irrigated by white owners	1,321	2,500	3,214
	4,048	6,019	7,150

It will be noted that a considerable acreage of the irrigable lands is dry farmed each year. Nearly 2,000 acres of land susceptible of irrigation were dry farmed during the season of 1926. In 1924, out of a total of 7,136 acres of project lands farmed, 3,088 acres (over 40 per cent of the area) were dry farmed, the remaining 4,048 acres having been irrigated. The custom regularly followed in dry farming is to crop the land during every other year, letting it lie fallow for the seasons between crop years, both for the purpose of destroying obnoxious weeds and for conserving moisture and replenishing soil fertility. Farmers object very strenuously to paying an operation and maintenance irrigation charge for the seasons the land is summer fallowed.

There are occasional seasons when climatic conditions are such and the rainfall is so distributed that it is possible to farm successfully without irrigation. This possibility naturally results in a tendency on the part of farmers to postpone irrigation as long as possible in the hope of rain, so as to obviate the necessity of irrigation. If the farmer succeeds in growing his crop by dry-farm methods and without the use of irrigation water, he naturally objects to paying an irrigation charge. Since, however, he may be under the necessity of irrigating at any time, it is of course necessary to keep up the project canals and structures to the same extent that is necessary on projects where irrigation is a constant necessity. As a matter of fact, it is apparent that irrigation works used only occasionally deteriorate more rapidly than when used constantly. Farmers, however, on projects of this kind fail to take these matters into consideration and urge all sorts of objections as to why they should not pay operation and maintenance charges if they do not use the water. It is found that for the period during which this project was operated by the Reclamation Service the agricultural activities are reported in considerable detail in the annual histories.

The following tabulation showing the acreage cropped and the per acre crop value for the years 1918 to 1923, inclusive, is compiled from the reports of the Reclamation Service.

Year	Total acreage cropped	Crop value per acre
1918	2,989	$16.12
1919	8,960	33.37
1920	9,937	25.00
1921	14,650	13.15
1922	8,652	16.22
1923	1,873	11.62

During the season of 1917 it is reported that 25,600 acres were under constructed works, of which 2,448 acres were irrigated. It is further reported that no water was used for irrigation before July 1 during that season. It will be noted from the above table that disregrading the acre crop values for the years 1919 and 1920, which are unusually high because of the war prices received for wheat which was the principal crop grown, together with good yields, the crop value for the remaining years of the period 1918 to 1923, inclusive, ranges from $11.62 to $16.22 per acre. As compared with this, attention is called to the fact that dry-farm crop values during the same years ranged from $8 to $12 per acre, so that the difference between crop returns on the irrigated land is not always sufficient to justify the increased expense entailed by irrigation.

For the season of 1921 it is reported that the season was unfavorabe for crop growth on both dry and irrigated land. There was not sufficient precipitation to produce a crop on dry land and there were some hot months in the middle of the summer that seriously affected even the irrigated crops. Most of the water users on the project during the seasons of 1919 to 1921 came to the project for the purpose of growing wheat in answer to the great demand for wheat during the war, and the consequent high prices. During the period of high prices and easy money, many irrigable allotments were sold at prices ranging from $10 to $20 per acre without improvements or water rights. Out of a total of 14,650 acres cropped during the season 1921, 11,012 acres were in wheat. From the project annual history for 1922, it is learned that climatic conditions were specially favorable for growth without irrigation, and as a result a much smaller area was irrigated during this season and during the season of 1921. For much of the time that this project was operated by the Reclamation Service, water was delivered on a water rental basis with a minimum charge of 75 cents for each acre-foot covered by an application for water service. Under this system the minimum charge of 75 cents per acre entitled the farmer to use one-half acre-foot per acre, and additional water was delivered at the rate of $1.50 per acre-foot.

A considerable number of the farmers now on the project came in during the period of high prices in 1919 and 1920 with the expectation of making money by growing wheat. During the period of high prices the ruling price for good irrigable land without improvements was $20 per acre. At the present time, however, there is practically no demand, and the land without improvements and not including irrigation works or water rights is said to be valued at $5 to $10 per acre.

Indians do not live on the project.—The Indians live almost entirely in the foothills and near the mountains in the western part of the reservation, where there are numerous streams and some of the country is forested, though the trees are not large. It is but natural that they should favor this country, where they have close at hand a plentiful supply of wood and water, rather than the treeless plain on which is located the irrigation project. Here they are sheltered from the frigid windstorms that sweep down over the open, flat country in the eastern part of the reservation, which is included in the irrigation project. The small creek valleys among the foothills afford them, for the present and doubtless will afford them for a long time to come, all the land they will cultivate.

It is among these Indians of the foothills, some 20 to 30 miles west of the irrigation project, that the superintendent of this reservation, Mr. F. C. Campbell, has had considerable success with what is known as the 5-year program. Under this plan many of the Indians have been led to take up farming in a small way, principally wheat and a few vegetables, and some of them have small bands of sheep which were supplied under a reimbursable plan.

The great difficulty, however, is going to be in keeping up the Indians' courage and perseverance through the unfavorable years (and they are bound to come, and come frequently in this country), when no crops will be grown, and there will be insufficient feed for livestock through the long severe winters and consequent loss. It is reported that 25 per cent of all Indian livestock then on the reservation was lost in the winter of 1916–17.

Many of these Indians who live in the foothills on their grazing allotments also have irrigable allotments in the irrigation project. For such of this irrigable land that is leased it is reported the Indians receive an annual rental of 50 cents per acre.

It is reported that there is now practically no demand for the purchase or lease of irrigable land and that, as a matter of fact, the irrigation construction charge which is a lien on the irrigable land makes it impossilbe to sell it. Superintendent Campbell reports that "the irrigable lands are no more attractive for sale purposes—in fact, at the present time are not as attractive—as the dry lands."

Holy Family Mission.—Under date of September 14, 1927, there was referred to your advisers by the Assistant Commissioner of Indian Affairs the question as to the equity or propriety of collecting irrigation charges from the Holy Family Mission of this reservation.

We were informed by several Indians and by some of the agency employees, as well as others with whom we conferred concerning this matter, that the land now irrigated at the mission through the Two Medicine Canal, was formerly irrigated through a canal built by the missionaries and the Indians; and that when the Two Medicine Canal was built by the Reclamation Service, the mission ditch was obliterated, and since then, apparently as the result of an under-

standing never reduced to the form of a contract, water for the mission has been served through the Government or Two Medicine Canal.

In view of the circumstances, and moreover for the reason that the mission has for many years carried on a wonderful work among these Indians, it is the opinion of the advisers that, if possible, the mission should be relieved of any charges for irrigation. If legislation is necessary to accomplish this, we suggest that the question be properly placed before Congress for consideration.

Absence of definite data in justifications.—Nowhere in the hearings for the past several years does it appear that the area irrigated by Indians on this project in 1926 was 45 acres. The acreage of Indian-owned land, irrigable and leased, as well as other definite information necessary for a study of the project, is omitted, and the reports and justifications are filled with generalities that mean little or nothing, with the statement usually made in reference to utililization of land by Indians, that "some of this land is farmed by Indians and more will be."

We are of the opinion that if the true conditions actually existing on this project had been accurately portrayed in the justifications Congress would not have appropriated $45,000 for the operation and maintenance of this project for the fiscal year 1929. In view of this, we suggest that no part of this appropriation be expended for permanent repairs or improvements until the matter receives further consideration by Congress, with definite and accurate data before their committee.

Irrigation of Carson Sinks Allotments, Nevada

1. RECOMMENDATIONS

Your advisors respectfully recommend that—

1. The Indian lands should pay no part of the irrigation district taxes.

2. The Indian land should pay no part of the cost of the proposed supplemental drainage unless and until an agreement shall have been entered into between the Commissioner of Indian Affairs and the irrigation district, such agreement to provide for the satisfactory construction, in accordance with plans to be submitted by the district and approved by the Commissioner of Indian Affairs, of a comprehensive system of drainage that will be beneficial to the Indian land.

3. The Indian lands should pay their equitable proportionate part of the improvement of the Truckee Canal, which apparently is $9,461.38 instead of $10,096.01, as claimed by the district.

4. The advisors are of the opinion, judging from the nature of local conditions and the attitude of the irrigation district officials, that it may be advisable for the Indian land to construct its own supplemental drainage, for the reason that the tract may in this way secure greater benefits at less expenditure than will be the case if the drainage is constructed by the district. This is a matter which should be thoroughly investigated by a board of competent engineers.

2. SYNOPSIS

In 1890 to 1903, 185 Paiute Indians were allotted 160 acres each on the public domain near what is known as Carson Sinks, Nev. These allotments, aggregating about 30,000 acres, were made under section 4 of the general allotment act of 1887. Beginning with the inception of the Truckee-Carson irrigation project, later termed the Newlands project, by the Reclamation Service, there was a desire on the part of those interested in the building of the project to give the Indians, in lieu of their desert land which was useless to them, a reduced area with water for irrigation from the project works, thus making available for agricultural purposes within the project several thousand acres of land. Finally, the Indian Bureau agreed, on August 15, 1906, to cancel the original 160-acre allotments, reserving for reallotment to the Indians sufficient land to provide them with 10 acres each, which was given them with a perpetual water right.

An irrigation system was built by the Reclamation Service in 1906 and the Indian Service bought a water right for all the then irrigable land on November 11, 1908. An additional right was purchased for some additional land on November 21, 1917.

Area and location.—The so-called reservation, or Carson Sinks allotments, embraces an area of 5,440 acres near the center of the Lahontan Valley, generally called Carson Sinks. It is supplied with water by the Newlands project. The

nearest railroad point is Fallon, 11 miles distant. The improved Lincoln Highway is 10 miles distant, and connection is made by a graded and graveled county highway.

Allotments.—Beginning in the year 1906, 496 allotments of 10 acres each have been made and approved. Allotments are still being made. No land is held in white ownership and no patent in fee has been issued to any Indian. No land has been leased.

Principal crops and yields.—The principal crops grown are alfalfa and grain. The acreage and yield during 1926 was as follows: Alfalfa, 796 acres, 2,400 tons, average unit price, $9 per ton; grain, 9,500 bushels, average unit price, $1 per bushel. The income from dairying and raising of turkeys was $25,000 for the same period.

The total acreage irrigated in 1926 was 1,400 out of a total of 4,877 acres irrigable in the reservation. The cultivated area was 1,174 acres with an estimated yield of $58,000 or approximately $48 per acre. All farming was done by Indians.

Construction cost and collections.—To June 30, 1926, the Indian Bureau has paid to the Reclamation Service the following amounts:

For water right on 4,077 acres, at $24	$99, 768. 72
For water right on 800.3 acres, at $60	1, 920. 72
Due for water right on 800.3 acres, at $60	46, 197. 28
For drainage on 4,877.3 acres, at $3.48	49, 603. 05
Due for supplemental drainage on 4,877 acres	16, 971. 96

(The latter item is in controversy.)

No collections are being made from Indians.

Maintenance and operation.—The Fallon irrigation system is operated by the Truckee-Carson irrigation district as part of the Newlands project. They charge the Indian Bureau a flat rate or a pro rata share of project operation and maintenance expense, based on the actual irrigable area, reduced to $1.25 per acre for the 1928 season. Eighty-four thousand and seventy-four dollars and fift-five cents has been expended by the Indiau Bureau to June 30, 1926, for maintenance and operation, none of which has been collected from the Indian farmers.

Drainage.—This has been a serious problem for several years and is caused by the limited underground storage and absence of any natural drains. Six miles of trunk drains were built in 1922 which relieved the south end of the reservation to a certain extent. The north end is still without drainage and badly in need of it. The constructed drains need a system of laterals to be fully effective.

Financial condition of Indian farmers.—These Indians are probably the poorest band, financially, of any in the State. They have no natural resources or even grazing land on their reservation. Due to the rough topography and the constant drainage problem, their land has been the most difficult to subdue and reclaim. In spite of these difficulties they have made as good or better progress than any other band. Starting in 1906 with no irrigated land, they had 1,200 acres in cultivation by 1920. Due to drainage troubles, the farms were practically abandoned at this time, but on completion of the drainage work they renewed their farming operations. They are now back to 1,400 acres irrigated, much of it new land. Due to their lack of capital, and the relatively large task of leveling the remaining lands, which, naturally, are rougher than those reclaimed, future progress will be very slow unless assistance is given.

3. DIGEST OF LEGISLATION

Act April 30, 1908 (35 Stat. 85): That in carrying out any irrigation project which may be undertaken under the provisions of the act of June 17, 1902 (32 Stat. 388), known as the reclamation act, and which may make possible and provide for in connection with the reclamation of other lands the irrigation of all or any part of the irrigable lands heretofore included in allotments made to Indians under the fourth section of the general allotment act, the Secretary of the Interior be, and he hereby is, authorized to make such arrangement and agreement in reference thereto as said Secretary deems for the best interest of the Indians: *Provided*, That no lien or charge for construction, operation, or maintenance shall thereby be created against any such reserved lands: *And provided further*, That to meet the necessary cost of carrying out this legislation, the Secretary of the Interior is authorized to expend, out of the sum appropriated in this act, for irrigation, an amount not exceeding $13,000.

Pursuant to the provisions of the act of April 30, 1908 (35 Stat. 85), arrangements were made with the Reclamation Service for acquiring water for 4,640 acres of Indian land, of which 3,730 acres have been allotted to 369 Paiute Indians.

Act of March 3, 1921 (41 Stat. 1225): For reclamation and maintenance charges on lands allotted to Paiute Indians within the Truckee-Carson project, Nevada, $8,000, reimbursable from any funds of the Indians now or hereafter available.

Act of May 24, 1922 (42 Stat. 559–580): For reclamation and maintenance charges on lands allotted to Paiute Indians within the Truckee-Carson project Nevada, $7,000, reimbursable from any funds of the Indians now or hereafter available.

Act of January 24, 1923 (42 Stat. 1174): For reclamation and maintenance charges on lands allotted to Paiute Indians within the Truckee-Carson project, Nevada, $7,000, reimbursable from any funds of the Indians now or hereafter available.

Act of June 5, 1924 (43 Stat. 390): For reclamation and maintenance charges on lands allotted to Paiute Indians within the Newlands project, Nevada, $6,000; for payment of annual drainage assessments against said lands, $2,100; in all, $8,100, reimbursable from any funds of the said Indians now or hereafter available.

Act of March 3, 1925 (43 Stat. 1146): For reclamation and maintenance charges on lands allotted to Paiute Indians within the Newlands project, Nevada, $6,000; for payment of annual drainage assessments against said lands, $2,500; in all $8,500; reimbursable from any funds of the said Indians now or hereafter available.

Act of May 10, 1926 (44 Stat. 458): For payment of annual installment of reclamation charges on 800.3 acres of Paiute Indian lands within the Newlands project, Nevada, and for operation and maintenance charges against Indian lands within said project, $13,500; for payment of annual drainage assessments against said lands, $2,500; in all $16,000 reimbursable from any funds of the Indians now or hereafter available.

Act of January 12, 1927 (44 Stat. 934): For payment of annual installment of reclamation charges on 800.3 acres of Paiute Indian lands within the Newlands project, Nevada, and for operation and maintenance charges, including operation of rains, against Indian lands within said project, $11,325; for payment of annual drainage assessments against said lands, $2,500; in all $13,825, reimbursable from any funds of the said Indians now or hereafter available.

4. HISTORY

Some 50 allotments of 160 acres each were made to the Fallon Indians in the year 1890, but some of these were found to be defective and were not finally approved until 1892. In 1893–94 some 146 additional allotments were made. Due to their extreme poverty and the great expense of bringing water to their land, the Indians made very little use of it.

On beginning the Truckee-Carson, now known as the Newlands irrigation project of the United States Reclamation Service, it was considered essential to the success of this project to have these lands included therein, and to have them improved and brought under cultivation. It was of course apparent that the Indians having 160 acres each of land would never be able to use it beneficially or to pay construction and operation and maintenance charges. Since, moreover, the land in its desert character was of no use to the Indians, the plan was advocated of giving the Indians allotments of lands of such size as they would be able to use beneficially, thus releasing the surplus lands to be included in the project. After considerable negotiation, the Indian agreed to cancel the original allotments, which was done with the consent of the original allottees, and there was reserved out of the original area of approximately 30,000 acres a tract of 4,640 acres for reallotment in 10-acre tracts with water. This was approved by the Indian Bureau August 15, 1906.

Application No. 01196 was made on November 11, 1908, for sufficient water for 4,640 acres of Indian land.

On May 8, 1917, F. H. Tillinghurst made a report regarding the Indian allotments then made.

On November 21, 1917, an additional 840 acres adjoining the reservation was reserved for the Fallon Indians by departmental order. This was done with a view of providing land for the Indians free from seepage troubles as most of the original allotments had become badly water-logged.

An additional tract, now known as the Fallon colony, consisting of SW. ¼ of NW. ¼ sec. 29, T. 19 N., R. 29 E., was reserved on August 23, 1917.

A contract was executed on January 22, 1921, between Truckee-Carson irrigation district and United States for drainage work. This work also furnished some drainage for the Indian reservation.

A report was submitted on January 13, 1922, by the supervising engineer of district No. 2 to the Commissioner of Indian Affairs, commenting on the advisability of purchasing water rights for an additional 810 acres of Indian land because of the exorbitant costs of water rights and of preparing the land for irrigation.

A hearing on this matter was held before the House Committee on Indian Affairs on March 8, 1922. On February 10, 1924, a report of drainage work done under contract with the Truckee-Carson irrigation district was made by W. A. Walker, field cost accountant for the Indian Irrigation Service. On February 14, 1924, Mr. Walker submitted a report on additional drainage work necessary to protect the project lands under the water-right contract.

Contract was issued December 18, 1926, between the United States and the Truckee-Carson irrigation district, providing for transfer of management of the irrigation works to the district, and for the repayment of construction charges.

5. LOCATION, TRANSPORTATION, AND MARKETS

The Fallon Reservation is located in Churchill County in western Nevada, in township 19 north, range 30 east. The Fallon Branch of the Southern Pacific is on the reservation, and Fallon, 12 miles distant, is the nearest station. The Lincoln Highway, graveled and of first-class construction, is 8 miles distant, and there are 3 miles of county road through the reservation. Markets for this reservation are usually found in California, but some of the Newlands products are sold in many of the central and eastern Nevada mining camps.

6. AREA AND CLASSIFICATION OF RESERVATION LANDS

The total area of the reservation is 5,280 acres, of which 4,877.3 acres are irrigable, and 1,402.7 acres are waste and grazing lands. Allotments were made in 1910, when 459 allotments of 10 acres each, or a total of 4,590 acres, were made. All of these allotments are held by trust patent, and no allotments have been sold to date.

7. POPULATION AND INDIAN HEALTH CONDITIONS

Indian tribe: Paiute.

	1925	1926	1927
Indian population	374	388	404
White population	16	16	7
Indian births	14	7	8
Indian deaths	13	7	8

Indians having tuberculosis	2
Indians having trachoma	94
Indians living in permanent homes	101
Full-blood Indians	391
Less than full blood	7
Indians receiving rations	7

8. CLIMATE

Period covered by reliable records, 1908 to 1926.
Maximum temperature, 105; minimum, −25.
Average maximum temperature, 100; average minimum, −2.
Average annual precipitation, 4.90 inches.
Estimated precipitation growing season, 2.30 inches.
Average annual rainfall, 4 inches.
Average annual snowfall, 3 inches.
Average date last killing frost (spring), May 20.
Average date first killing frost (fall), September 21.
Average length growing season, 134 days.
Estimated percentage sunshine, growing season, 98 days.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(*a*) *Topography.*—A topographic map was made of the reservation by the Reclamation Service in 1903. The scale used was 4 inches to 1 mile; contour interval, 5 feet.

Average slope of irrigable area, 5 feet per mile.
Maximum slope of irrigable area, 20 feet per mile.
Minimum slope of irrigable area, 5 feet per mile.
Irrigable area uniform as to slope, 84 per cent (estimated).
Irrigable area broken by ridges, etc., 16 per cent (estimated).
Range in elevation, irrigable area, 3,900 to 3,920.
Cost of leveling smoothest lands, $30.
Cost of leveling roughest lands, $100.
Average cost of leveling land, $50 to $60.

The north end of the reservation is somewhat wind blown, with consequent heavy cost for leveling. Water is distributed by the Truckee-Carson irrigation district on demand. The irrigation method used almost entirely is the border check system. The average duty of water is 3 acre-feet on the land and varies but little either way on the different soils. The Indians as a rule irrigate rather copiously (6 acre-feet) the first few years until the crop (alfalfa is always the first) is set.

(*b*) *Soil.*—Soil survey was made by Strahorn and Van Byne in 1909. The reservation lands are classed as follows:

Soil	Acres	Depth	Subsoil	Native vegetation
Lahontan fine sandy loam [1]	4,640	6 to 8 feet	Lake sediments	Greasewood, rabbit brush.
Carson clay adobe [2]	640	Several hundred feet.	do	Greasewood, 24 inches high; sagebrush, 18 inches to 3 feet high.

[1] Good alfalfa land, 2 to 6 tons per acre; $18 to $60. Fair potato land, 3 to 6 tons per acre; $48 to $240. Wheat, about 18 to 30 bushels per acre; $18 to $30.

[2] Good wheat land, 30 to 60 bushels per acre; $30. Alfalfa, 2 to 4 tons per acre; $12 to $40. Potatoes, about 2 tons per acre; $32 to $80.

(*c*) *Drainage.*—Approximately 300 acres in section 9 are water-logged, and this area is increasing rapidly. Almost all of sections 22 and 16 are affected by seepage. The south half of section 20 and 21 are badly alkalied and it is very doubtful if this area can be reclaimed. A part of the 110 acres farmed in section 9 was abandoned the past season.

It is only a question of time until the balance will be worthless. It can be reclaimed by constructing a drain to take care of waste water from S canal. Approximately 6 miles of main drains have been built through the south and east ends of the reservation, but, due to lack of any laterals, this system is not as effective as it might be. Cost of drainage to date is $49,603.05.

10. WATER SUPPLY AND WATER RIGHTS

(*a*) *Water supply.*—The water supply for the Fallon Reservation is obtained from the Truckee and Carson Rivers as a part of the Newlands project, now operated by the Truckee-Carson irrigation district. The Newlands project acquired a number of old vested rights on the Carson River, but the largest part of their water supply depends on the storage of flood waters from both streams. The storage reservoirs now available are Lake Tahoe on Truckee River, capacity approximately 200,000 acre-feet, and Lahontan Reservoir on Carson River, capacity 270,000 acre-feet. Lahontan is also supplied with water from the Truckee River carried through the Truckee Canal. Lake Tahoe has not been a success as a storage reservoir due to the fact that the Truckee River Power Co. has prior storage rights and receives all the storage at the lower elevations. There never has been a water shortage on the Newlands project since the construction of Lahontan Dam and the supply is considered the best in the State. When all lands are under cultivation the supply may be slightly inadequate, in which case more water can be brought in from the Truckee River by enlarging the Truckee Canal.

(*b*) *Project Diversions*

	1922	1923	1924	1925	1926
Acre-feet for season	4,488	3,319	2,984	5,706	6,189
Acres irrigated	934	1,003	760	907	1,174
Acre-feet per acre	4.8	3.3	3.9	6.2	5.2
Average second-feet:					
April	3.6	5.6	6.6	9.9	14.4
May	13.9	10.0	9.9	18.9	18.4
June	15.6	9.7	9.8	19.4	21.9
July	17.5	11.5	10.5	16.2	20.6
August	11.4	7.7	9.4	9.5	12.3
September	8.5	4.4	2.0	14.4	7.0
October	3.0	2.5	.4	1.7	2.7

NOTES.—Years 1922 to 1924, water measured at head of farm lateral. Years 1925–26, measured in main canal.

(*c*) *Water rights.*—Water right for the original reservation was purchased from the Reclamation Service November 11, 1908, for 4,077 acres at $24 per acre under application No. 01196. This has been fully paid. An additional water right for 800.3 acres is being bought at the rate of $60 per acre. The Newlands project itself obtains the water by storage of flood waters on both rivers; under decree of the Federal Court, District of Nevada, No. A–3, U. S. *v.* Orr Ditch Co. et al., for the Truckee River, the amount decreed was 1,500 second-feet, priority of 1902, while the waters of the Carson River are now in process of adjudication.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

The irrigation system of the Fallon Indian Reservation was built by the Reclamation Service and is a part of the Newlands project. The system is complete for the lands in the original reservation (4,077 acres irrigable), but on the new lands the only irrigation works are those built by the Indian farmers. In 1921 the Reclamation Service built a trunk drain through the center of the original reservation. This has been quite effective in draining the adjoining lands. but should have some laterals to completely drain the lands. The new land is very much in need of a drainage system.

12. SUMMARY OF PROJECT WORKS

(*a*) *Storage.*—Lake Tahoe, on Truckee River, capacity 200,000 acre-feet. Lahentan Reservoir, on Carson River, capacity 270,000 acre-feet.

(*b*) *Canals.*—Capacity 100 to 250 second-feet, 4.17 miles. Capacity 50 to 100 second-feet, none. Capcaity 15 to 50 second-feet, 1.20 miles. Capacity less than 15 second-feet, 21.50 miles.

(*c*) *Diversions*

	Number	Construction yards	Board measure lumber	Pipe feet	Approximate cost
Canal head gates	None.				
Farm turnouts	32		6,400		$640
Checks and turnouts [1]	31		26,350		3,875
Drop checks and turnouts [1]	3	23	40	60	650
Wood culverts	13		9,100		455

[1] Also act as lateral head gates.

(*d*) *Drains.*—Capacity 15 to 50 second-feet, 6.60 miles.

(*e*) *Buildings.*—None (except agency property).

13. Area and utilization of irrigable lands

	1924	1925	1926
Acreage arable	4,877	4,877	4,877
Acreage irrigable	4,077	4,077	4,077
Acreage irrigated (estimated)	1,000	1,250	1,400
Acreage cultivated	760	907	1,174
Total crop value	[1]	$41,722	$57,567
Average crop value per acre	[1]	$46	$49
Indians farming	[1]	56	82
Lessees farming	None.	None.	None.
White owners farming	None.	None.	None.
Average acreage cultivated per family	[1]	18	14.3
Average crop value per family		$745	$702

[1] No data.

14. PRINCIPAL CROPS, CROP YIELDS, AND RETURNS

As the year 1926 is the only one for which a detailed crop report is available this is given and is considered typical of an average year.

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre	Total value
Alfalfa	796	3 tons	$9	$27.00	$21,492
Grains	352	35 bushel			9,475
Potatoes and gardens	26			100.00	2,600
Chickens and turkeys			40 cents per pound		18,000
Dairy cows			$100 per year		6,000
	1,174			48.94	57,567

15. Economic conditions among project farmers

	1925	1926
Families farming	56	82
Acres cultivated	907	1,174
Acreage per family	18	14.3
Average crop value per family	$745	$702
Total livestock:		
Horses	140	193
Dairy cows	35	60
Beef cattle	None.	None.
Sheep	None.	None.
Hogs	20	6
Total farm equipment:		
Plows	60	60
Mowers	10	10
Automobiles	20	25
Trucks		5
Average annual per capita payment from tribal resources	None.	None.
Total Indian reimbursable debt, not including irrigation	$3,831.19	$3,788.64

Annual acre construction assessments on Indian land: No assessments being made.

Annual acre operation and maintenance assessments on Indian land: No assessments being made.

NOTE.—There are no non-Indian farmers, and no Indian land is leased.

16. PROJECT OPERATION AND MAINTENANCE

The reservation is a part of the Newlands project of the Reclamation Service, and the Indian Service has no maintenance and operation organization.

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(a) Construction cost to June 30, 1927

Estimated cost to complete for 4,877 acres (total proposed ultimate area)	$25,000.00
Present cost per acre for 4,077 acres	24.00
Present cost per acre for 800.3 acres	60.00
Present cost per acre for drainage 4,877.3 acres	10.17
Estimated per acre cost when completed (includes drainage)	45.00
Per acre value of land without irrigation (if in an irrigation project)	10.00
Per acre value of land when irrigated	125.00
Increased value of land by irrigation	115.00

(b) Collection of construction cost

1. Total construction assessments to date	195,468.00
Supplemental drainage (in controversy)	16,704.00
Total	212,170.00
2. Per acre annual construction assessment [1]	
3. Total construction assessments paid to date	151,292.40
4. Total construction collections to date	None.
5. Total construction delinquencies to date	None.
6. Total penalties to date	[2]
7. Rate of penalty on delinquencies	[2]

To date the Indian Service has paid to the Reclamation Service the following sums:

For construction on original land, 4,077 acres	$99,768.72
For construction on new land, 800.3 acres	1,920.72
For construction drains (being paid)	49,603.05
Total	151,292.49
Due for construction on new lands	46,197.28
Due for construction on supplemental drains (in controversy)	16,701.96
Due for Truckee Canal improvement (also in controversy)	10,096.01
Reimbursable funds	51,212.23
Nonreimbursable funds	96,238.82
	147,451.05
Chief engineer's office charges	610.28
	148,061.33

(c) Operation and maintenance cost to June 30, 1927

Reimbursable appropriations	84,074.55
Nonreimbursable appropriations	None.
	84,074.55

(d) Operation and maintenance collections to June 30, 1927.—The water contract area, 4,877.3 acres, is used in computing the per acre annual operation and maintenance assessments, which are made for the calendar year and are made and due in advance March 1. Delivery of water is withheld to enforce operation and maintenance collections. The assessments for Indian lands are paid by congressional appropriation. The estimated total cost of operation and maintenance is pro-rated for the total irrigable acreage in the Truckee-Carson irrigation district and Indian lands. The method of computing operation and maintenance assessments complies with the State law regarding irrigation districts.

The Truckee-Carson irrigation district claims that the Indian Service is in arrears $611.55 for drainage operation and maintenance (1924–25) and $292.63 for same feature for year 1926.

[1] Construction costs are not being collected from Indians, and there are no white owners or lessees involved.
[2] No penalty on Indian land.

Total penalties on delinquencies to date	None.
Per acre operation and maintenance assessment for 1927	$1. 50
Per acre operation and maintenance assessment for 1928	$1. 25
Operation and maintenance paid for Indian land, 1927	$7, 315. 95
Operation and maintenance delinquencies on Indian land not leased, 1924, 1925, and 1926	$904. 18
Operation and maintenance delinquencies on Indian land not leased, 1927	None.
Rate of penalty on delinquencies	None.

18. PROJECT DEFECTS, PROBLEMS, AND COMPLAINTS

This project seems to be well planned, and construction of canals is first class. Structures are made of wood, which is not entirely satisfactory, but they have served their purpose quite well. The chief defect or drawback to successful farming is the lack of good drainage. The new land—that part added to the reservation by departmental order of November 21, 1917—has no irrigation system, except such features as the Indians have built of their own accord. In order to fully develop this tract of land it will be necessary for the Indian Service to build the system or provide funds for the Truckee-Carson irrigation district to do the work.

Land improvement.—The land in the Fallon Reservation all requires considerable labor and expense to clear and level. Naturally the easiest land is developed first and that is the situation here. The remaining land will require more than an ordinary effort to subdue and on this feature the Government could assist immensely by providing funds and supervision for this work. Other than first-class farm land, these Indians have no natural resources; no timber or fuel, or even grazing land. These Indians are very poor, and always have been, consequently their assets and farming capital are almost nil. Another problem, common on other reservations, is the large amount of land held as heirship land. Considerable land is also held by old and physically incapable Indians.

Claims of the Truckee-Carson irrigation district.—The operation and maintenance of the Newlands project was taken over by the Truckee-Carson irrigation district on December 31, 1926. The Indian land pays its proportionate share of the operation and maintenance charges to the district, but is not a part of the district.

There are now pending before the Bureau of Indian Affairs three claims from the Truckee-Carson irrigation district, as follows:

1. A claim for a prorata part of the general taxes of the irrigation district for the period 1919 to 1928 inclusive, amounting to $4,438.30.

2. A claim for drainage construction under the supplemental drainage contract of April 30, 1925, between the Bureau of Reclamation and the Truckee-Carson irrigation district. The total amount alleged to be due on this claim is $16,972.

3. A claim for the prorata share of the cost of improving the Truckee main canal under the contract of December 18, 1926, providing for the transfer of the Newlands project works to the Truckee-Carson irrigation district. The amount alleged to be due on this claim is $10,098.01.

With respect to the first of the above claims, it should be stated that the Indian lands are not within the district and it is not seen how the district laws are applicable, or how the district can legally levy taxes against the Indian lands. To thus levy taxes against the Indian lands would seem to us inequitable, as the Indian lands have no voice in the operation and management of the district, and do not share equally in all of the district benefits. According to the contract of December 18, 1926, only the district lands receive the profits from the Lahontan power plant, the income from Carson Lake pasture lands, rentals from Lake Tahoe lands and benefits from other possible assets of the project. Moreover, under the contract between the United States and the Truckee-Carson irrigation district providing for the transfer of the management of the irrigation works to the district and other purposes, while the district is not prohibited from building new laterals and irrigation structures with operation and maintenance funds, they are not required to construct such works on or for the Indian lands.

Concerning the claim for drainage construction under the supplemental drainage contract of April 30, 1925, a report on this matter was submitted to the Bureau of Indian Affairs on February 18, 1927.

Under the supplemental drainage agreement of April 30, 1925, a total of $245,000 was authorized. The assessments under this proposed construction

expenditure have been apportioned on the basis of 70,403 acres of district lands, making a unit cost of $3.48 per acre. The claim of $16,972, or more correctly, $16,971.96, has been computed as an assessment of $3.48 per acre for 4,877.5 acres of Indian lands. If the Indian lands are to participate in the proposed supplemental drainage cost of $245,000, the unit assessment should be made on the basis of a total of 75,280 acres benefited, instead of 70,403, which would make a per-acre cost of $3.255 per acre instead of $3.48 per acre, or a total cost for the Indian lands of $15,674.64 instead of $16,971.96. Attention is also called to the fact that the first assessment under the supplemental drainage agreement of April 30, 1925, is not due until January 1, 1946, and it does not appear that any appropriation is necessary, at this time. If the Indians are to participate in this supplemental drainage cost, some agreement should be entered into with the Truckee-Carson irrigation district relative to proposed drainage construction that will provide for adequate drainage construction work necessary to relieve lands that are now water-logged and unproductive.

Regarding supplemental drainage, the district has proceeded with the construction of drain ditches on the assumption that the Indian lands were not a part of the district and were not entitled to any of the benefits of this work. No attempt has been made to provide lateral drains for the Indian lands, a part of which are badly in need of drainage. The original drainage construction contemplated only the construction of main or trunk drains, and the relief of such large areas as were affected by seepage at that time. The supplemental drainage program contemplated some lateral drain construction, but it also should have provided drainage in more detail than that proposed for the benefit of Indian lands. The white-owned lands of the district have been relieved of seepage conditions to a much greater extent than those of the Indian lands. It is believed that supplemental drainage construction for the immediate benefit of Indian lands could be handled much better by the Indian Bureau than by the Truckee-Carson irrigation district. The principal cause of seepage in the north end of the reservation is the seepage from the main "S" Canal, a distribution canal of the district irrigation system. Project manager, D. S. Stuver, states that the district contemplates building a wasteway or drain at the end of this canal, but to date no definite plans for this work have been made. If the Indian lands are to participate in the cost of this supplemental drainage construction, some agreement should be entered into with the Truckee-Carson irrigation district. Until some such agreement is executed, the supplemental drainage claim should not be approved.

Concerning the third claim of the irrigation district that the Indian lands should pay a pro rata share of the cost of the Truckee Canal, attention is called to the fact that in article 27 of the contract of December 10, 1926, the United States agrees to expend approximately $150,000 for repairs to the Derby diversion dam and improvement of the Truckee Canal, said amount to be repaid by the district according to the provisions in the contract.

The enlargement and repair of the Truckee Canal will make it possible to bring in an additional water supply of approximately 80,000 acre-feet annually. The Indian lands will share in this water to an equal amount with all other lands (art. 41, contract December 18, 1926). If the Indians derive benefit from this construction, it would be equitable that they should pay their proportionate share of the expense; but, however, under a new apportionment of benefits, which will take into consideration all the lands benefited and reduce the per-acre rate. The apportionment of costs for this work is now distributed over 72,466 acres of district lands, the irrigable area at this time. If the Indians share in this expense, an additional 4,877 acres should be added, making a total of 77,343 acres. The rate would then be $1.94 per acre, and the total cost of Indian lands $9,461.38 instead of $10,096.01. The assessments, however, for this work are not due until January 15 of the year succeeding the completion of the work by the United States.

19. CONCLUSIONS AND RECOMMENDATIONS

In view of the foregoing, and from information gained by an inspection of conditions in the field, and from conferences with various local people and officials, it is the judgment of the advisors that: (1) The Indian lands should pay no part of the irrigation district taxes; (2) the Indian land should pay no part of the cost of the proposed supplemental drainage unless and until an agreement shall have been entered into between the Commissioner of Indian Affairs and the irrigation

district, such agreement to provide for the satisfactory construction, in accordance with plans to be submitted by the district and approved by the Commissioner of Indian Affairs, of a comprehensive system of drainage that will be beneficial to the Indian land; (3) the Indian lands should pay their equitable proportionate part of the improvement of the Truckee Canal, which apparently is $9,461.38, instead of $10,096.01, as claimed by the district.

The advisors are of the opinion, judging from the nature of local conditions and the attitude of the irrigation-district officials, that it may be advisable for the Indian land to construct its own supplemental drainage, for the reason that the tract may in this way secure greater benefits at less expenditure than will be the case if the drainage is constructed by the district. This is a matter which should be thoroughly investigated by a board of competent engineers.

Irrigation on Colorado River Reservation, Ariz.

1. RECOMMENDATIONS

Your advisors respectfully recommend that:

1. The sum of $119,914.61, representing the cost of construction of the Grant-Dent Canal and other irrigation work and activities on the Colorado River Indian Reservation from 1867 to 1910, inclusive, or prior to the inception of the present irrigation project, and now carried in the accounts as an item of cost of the present project, be written off as a loss.

2. Immediate consideration be given to the construction of a complete and adequate drainage system, and that, accordingly, an appropriation of $20,000 be requested for making the necessary investigations and preparing a report with estimated costs of the necessary work, the investigations to be made by an experienced drainage engineer, and the final plans and estimate to be reviewed by a board of consulting engineers.

3. The existing levee system be strengthened and extended so as to give reasonable protection against floods.

4. This project be henceforth restricted to its present limits and that no more lands be included.

5. The land be classified and that operation and maintenance assessments be suspended on all land adversely affected as to productivity by alkali impregnations or other conditions.

6. All construction assessments or repayments be suspended until after the project is completed by the construction of an adequate drainage system and a reasonably safe levee system.

7. As soon as possible annual operation and maintenance assessments on all irrigable lands be made uniform and that varied conditions of the land included in the various leases be taken up by differences in the lease period rather than in the irrigation charges as at present.

8. All construction charges heretofore paid be credited to operation and maintenance on the lands affected.

9. The cost of the gravity project surveys and investigations, be suspended as an item of cost of the present irrigation project and be made a part of the cost of the proposed gravity project when that is constructed.

10. An appropriation of $100,000 chargeable to the proposed gravity project, be requested for investigating the feasibility of a high dam at Empire Flat for storage, diversion and power in connection with the gravity project, such investigation to be made by the Bureau of Reclamation as being better equipped for carrying on such work than the Indian irrigation service.

11. A minimum lease period of 10 years should be adopted, the lessee to pay the operation and maintenance charge annually in advance in addition to the amount covered in the lease as rent.

2. SYNOPSIS

The Colorado River Reservation was established by act of Congress of March 3, 1865, for the purpose, as stated in the justification, "to colonize some 10,000 Indians within its boundaries" * * * and "to aid them in opening an irrigating canal, so that they may become industrious and self-supporting."

Location and area.—The reservation is approximately rectangular in outline, extending in a nearly southerly direction from Monument Peak in California, to La Paz Arroyo near Ehrenburg, Ariz., a distance of about 45 miles. Its greatest width is about 15 miles. The area is 242,710 acres, of which about 100,000 acres,

known as the Parker Valley, is arable river bottom land on the east, or Arizona side of the river. The Colorado River flows southwesterly through the north half of the reservation to a point about 4 miles south of Riverside Mountain, Calif., and thence flowing in a southerly direction, forms the west boundary of the south half of the reservation.

The Los Angeles-Phoenix line of the Santa Fe Railroad (built in 1906) passes through the northernpart of the reservation, crossing the Colorado River at Parker.

First irrigation canal (1867).—The Grant-Dent Canal, notable as being the first irrigation canal built by the Government, was begun in December, 1867, and completed and first used in July, 1870. It was found impossible with the means then at hand to maintain this canal and it was abandoned in 1876.

Following this, and up to 1912, various plans for providing irrigation water were tried, but all soon ended in failure. These early efforts, none of which is of any benefit to the present generation of Indians, involved a total expenditure of $119,914.61.

The present irrigation project consists of a pumping plant taking water from the Colorado River, and a distributory system, now covering an area of about 10,000 acres at the upper end of Parker Valley, The pumping plant consists of two oil-burning, steam-driven units with a capacity of 115 to 135 second-feet, inclosed in a substantial concrete building. The project is incomplete in that neither a drainage system, nor an adequate levee to prevent flooding of the land at high stages of the river, has been constructed.

Allotments.—Beginning in 1912, 748 allotments of 10 acres each were made and have been approved. All Indians then living received allotments, and these are held under trust patents. No land within the reservation, other than lots in the Government townsite of Parker, is in white ownership.

Indian land leases.—It was soon found that clearing, leveling, and improving the land—involving an expenditure of $25 to $125 an acre—is an impossible task for the average Indian. Accordingly, in 1916, a policy of leasing was instituted for the purpose of placing the land in cultivation so the Indians could use it. The lessee, in consideration of his work in clearing and improving the land, receives the use of it for a certain specified period, usually three to seven years, depending on the estimated cost of improving it. At the expiration of the lease, the land is turned back to the Indian allottee if he is able to farm it, or if the allottee is unable to farm the land, it is rented.

Operation and maintenance charges paid by lessees.—The lessee is required to pay an annual operation and maintenance charge on the total irrigable area, whether cultivated or not. This charge varies from $2 per acre for 4 acre-feet of water, in the leases first made, to $6.50 per acre for 4 acre-feet in leases made since 1924. There are heavy penalty charges varying from $1 to $3.25 per acre-foot, for water in excess of 4 acre-feet. The actual cost to the Government of operation and maintenance is given as $6.50 per acre.

Construction assessments paid by lessees.—In leases made since January 1, 1925, lessees are also required to pay a construction charge of $1 to $4.50 per acre annually, depending on the condition of the land.

Total of irrigation charges paid by lessees.—This consists of the operation and maintenance and the construction charges if, and as specified in the various leases made by the superintendent of the reservation, and varies, as indicated in the foregoing, from $2 to $11 per acre annually; or more, if more than 4 acre-feet of water is used.

Differences in assessments and collections charged against leased land.—The difference between the annual construction assessment and the construction charges actually collected from the lessee—if less than the assessment—is charged against the land. In leases now being made it is stipulated that the lessee shall pay the actual operation and maintenance cost and the regular construction assessment so that there will be no deficit to be thus charged against the land. This is not the case, however, with the earlier leases.

Indians pay no irrigation charges.—On Indian land not leased, irrigation charges are not being collected. Failure to collect is explained by the statement that the Indians are financially unable to pay. In such cases, however, the annual construction assessment is being charged against the land.

Operation and maintenance assessments and collections.—Indians are not required to pay any part of the operation and maintenance cost, as it is stated they are financially unable to do so. The operation and maintenance cost assessable against Indian land not leased is supplied by a Congressional appropriation (reimbursable) and becomes a lien on the land.

The total operation and maintenance cost to June 30, 1927, is $408,255.25. Of this amount, $96,197.66 had been assessed against Indian land leased and of this $95,309.31 had been collected, leaving $888.35 due and uncollected. The accrued operation and maintenance cost to date is approximately $68 per acre.

Construction cost assessments and collections.—Construction charges are not being collected on Indian land not leased. On land leased since January 1, 1925, construction charges of $1 to $4.50 an acre—the rate varying with the condition of the land—are being assessed and collected. To June 30, 1927, $14,366.06 had been collected. The total construction cost assessed on all irrigable land beginning November 15, 1920, to June 30, 1927, is given as $137,350.08.

Crop yields and returns.—During the season of 1925, of an irrigable area of 6,100 acres, 5,459 acres were cultivated. Seventy Indians farmed 1,896 acres, producing crops of an estimated value of $109,696, or an average value of $59.60 an acre. Thirty-two lessees farmed 3,563 acres, producing crops estimated at $315,960 or an average of $86.90 an acre.

In 1926, 78 Indians farmed 2,305 acres, producing crops valued at $91,542, or an average of $41.24 an acre; and 35 lessees farming 3,615 acres, produced crops estimated at $252,926.46 or an average of $70.10 an acre. The principal crops grown are cotton, of which the average yield by Indian farmers was 0.45 bale and by lessees 0.95 bale; and alfalfa, of which the average yield by both Indians and lessees was the same: 6 tons. The average prices received were $70 a bale for cotton and $15 a ton for alfalfa.

Construction cost.—The construction cost to June 30, 1927, as given in data supplied by the supervising engineer is $506,831.30. This includes the cost of the Grant-Dent Canal and other early activities—irrigation and otherwise (1865–1911)—which is given as $119,914.61. This early work in no way is related to the present irrigation project. Deducting this amount, the actual construction cost of the existing project to June 30, 1927, is $386,916.69.

However, this project is not completed. It is the opinion of the advisers that a drainage system, and necessary repairs and extensions to the levee, will involve an expenditure of approximately $233,000, thus making a probable total cost for the completed project of $620,000. The total cost of the project completed as suggested and prorated to the area benefited—approximately 9,000 acres—would result in an acre cost of about $70, whereas the cost to date prorated to the acreage that can now be farmed—about 6,000 acres, as is now being done in computing construction assessments—gives an acre cost of about $85. It thus appears that the acre cost of the completed project, by reason of the increased area, would not greatly exceed that of the present project. It is of course realized that should this be done, it would require some years to reclaim the 3,000 acres now alkalied. It is our opinion, however, that it would be better to reclaim the alkalied and abandoned land, which is already cleared and leveled, than constantly to extend the project to include new land in lieu of that abandoned. Taking new land into the project involves the large initial cost of clearing and leveling, and this new land, without drainage, within a few years will be in the same condition as the land already abandoned. Thus the present process of subduing new land, cultivating it a few years with rapidly diminishing crop yields and then abandoning it and moving again on to new land, will, if continued, make the entire Parker Valley an alkali desert.

3. DIGEST OF LEGISLATION, TREATIES, AND EXECUTIVE ORDERS

Act March 3, 1865 (13 Stat. 559): All that part of the public domain in the Territory of Arizona, lying west of a direct line from Half-way Bend to Corner Rock on the Colorado River, containing about 75,000 acres of land, shall be set apart for an Indian reservation for the Indians of said river and its tributaries.

Act March 2, 1867 (14 Stat. 514): For the expense of collecting and locating the Colorado River Indians in Arizona, on a reservation set apart for them by section 1, act of March 3, 1865, including the expense of constructing a canal for irrigating said reservation, $50,000.

Act July 27, 1868 (15 Stat. 222): For completing the construction of an irrigation canal on the Colorado River Reservation in Arizona, $50,000.

Act May 29, 1872 (17 Stat. 188): For collecting and locating the Colorado River Indians in Arizona. For completing the construction of the irrigating canal on the Colorado River Reservation in Arizona, $20,000.

Act April 21, 1904 (33 Stat. 224): Sec. 25. That in carrying out any irrigation enterprise which may be undertaken under the provisions of the reclamation act

of June 17, 1902, and which may make possible and provide for, in connection with the reclamation of other lands, the reclamation of all or any portion of the irrigable lands on the Yuma and Colorado River Indian Reservations in California and Arizona, the Secretary of the Interior is hereby authorized to divert the waters of the Colorado River and to reclaim, utilize, and dispose of any lands in said reservations which may be irrigable by such works in like manner as though the same were a part of the public domain: *Provided*, That there shall be reserved for and allotted to each of the Indians belonging to the said reservations, five acres of the irrigable lands. The remainder of the lands irrigable in said reservations shall be disposed of to settlers under the provisions of the reclamation act: *Provided further*, That there shall be added to the charges required to be paid under said act by settlers upon the unallotted Indian lands such sum per acre as in the opinion of the Secretary of the Interior shall fairly represent the value of the unallotted lands in said reservations before reclamation; said sum to be paid in annual installments in the same manner as the charges under the reclamation act. Such additional sum per acre, when paid, shall be used to pay into the reclamation fund the charges for the reclamation of the said allotted lands, and the remainder thereof shall be placed to the credit of said Indians and shall be expended from time to time, under the direction of the Secretary of the Interior, for their benefit.

Act April 4, 1910 (36 Stat. 273): For the construction of a pumping plant to be used for irrigation purposes on the Colorado River Reservation, together with the necessary canals and laterals, for the utilization of water in connection therewith, for the purpose of securing an appropriation of water for the irrigation of approximately 150,000 acres of land, $50,000, to be reimbursed from the sale of the surplus lands of the reservation.

Act March 3, 1911 (36 Stat. 1063): That the first proviso in section 25 of the Indian appropriation act, approved April 21, 1904 (33 Stat. L. 224), is hereby amended so that the first sentence in said proviso shall read as follows: "*Provided*, That there shall be reserved for and allotted to each of the Indians belonging on the said reservation ten acres of the irrigable lands"; and there is hereby appropriated the sum of $18,000, or so much thereof as may be necessary, to defray the cost of the irrigation of the increased allotments, for the fiscal year 1912: *Provided*, That the entire cost of irrigation of the allotted lands shall be reimbursed to the United States from any funds received from the sale of the surplus lands of the reservations or from any other funds that may become available for such purpose: *Provided further*, That in the event any allottee shall receive a patent in fee to an allotment of land irrigated under this project, before the United States shall have been wholly reimbursed as herein provided, then the proportionate cost of the project to be apportioned equitably by the Secretary of the Interior shall become a first lien on such allotment, and the fact of such lien shall be recited on the face of each patent in fee issued and the amount of the lien set forth thereon, which said lien, however, shall not be enforced so long as the original allottee, or his heirs, shall actually occupy the allotment as a homestead, and the receipt of the Secretary of the Interior or of the officer, agent, or employee duly authorized by him for that purpose, for the payment of the amount assessed against any allotment as herein provided shall, when duly recorded by the recorder of deeds in the county wherein the land is located, operate as a satisfaction of such lien.

Act August 24, 1912 (37 Stat. 523): For continuing the construction of necessary channels and laterals for the utilization of water in connection with the pumping plant for irrigation purposes on the Colorado River Indian Reservation, Ariz., as provided in the act of April 4, 1910 (36 Stat. L. 273), for the purpose of securing an appropriation of water for the irrigation of approximately 150,000 acres of land and for maintaining and operating the pumping plant, $35,000, reimbursable as provided in said act.

Act June 30, 1913 (38 Stat. 85): For carrying out the provisions of the act of April 4, 1910; for maintenance and operation, $25,000, reimbursable.

Act August 1, 1914 (38 Stat. 587): For maintenance and operation, $15,000, reimbursable in accordance with the provisions of the act of April 4, 1910.

Act May 18, 1916 (39 Stat. 129): For carrying out the provisions of the act of April 4, 1910; for maintenance and operation, $15,000, reimbursable.

Act March 2, 1917 (39 Stat. 974): For maintenance and operation, $15,000, reimbursable in accordance with the provisions of the act of April 4, 1910.

Act May 25, 1918 (40 Stat. 568): For carrying out the provisions of the act of April 4, 1910; for maintenance and operation, $20,000, reimbursable; for surveys and the preparation of plans and estimates for a complete irrigation system,

$50,000, reimbursable from the proceeds of the sale of town lots authorized by the act of April 13, 1908 (35 Stat. 77), in all $70,000.

Act June 30, 1919 (41 Stat. 10): For carrying out the provisions of the act of April 4, 1910, for the installation of a settling basin, $11,000; for continuing the construction of necessary canals and laterals, $82,000; for maintenance and operation, $41,000, reimbursable as provided in the act of April 4, 1910; and for the conduct of surveys and the preparation of plans and estimates for a complete irrigation system, $54,000, reimbursable from the sale of town lots authorized by the act of April 13, 1908, in all $188,000.

Act February 14, 1920: For carrying out the provisions of the act of April 4, 1910, for continuing construction of canals and laterals ,$50,000; for maintenance and operation, $36,000, in all $86,000, reimbursable, as provided in the aforesaid act.

Act May 24, 1923: For carrying out the provisions of the act of April 4, 1910, for continuing construction of canals and laterals, $30,000, for maintenance and operation, $35,000, in all $65,000, reimbursable.

Act January 24, 1923: For carrying out the provisions of the act of April 4, 1910, for continuing construction of canals and laterals, $20,000; for maintenance and operation, $35,000; in all $55,000, reimbursable.

Act March 3, 1925: For carrying out the provisions of the act of April 4, 1910, for continuing construction of canals and laterals, $10,000; for maintenance and operation, $10,000; in all $20,000, reimbursable.

Act May 10, 1926: For continuing construction of canals and laterals, $5,000; for maintenance and operation, $10,000, in all $15,000 reimbursable.

Act January 12, 1927: For carrying out the provisions of the act of April 4, 1910 for improvement, maintenance and operation, $10,000 reimbursable.

Executive orders.—The area of the reservation was increased from time to time by changes in the boundaries made by virtue of executive Orders of November 22, 1873, November 16, 1874, and May 15, 1876. The Executive order of November 22, 1915 restored to the public domain a tract of about 18 square miles of mountainous land at the south end of the reservation.

4. HISTORY

Reservation established.—The Colorado River Indian Reservation was established by a provision contained in the Act of Congress of March 3, 1865 (13 Stat. L. 559) as follows:

"All that part of the public domain in the Territory of Arizona, lying west of a direct line from Halfway Bend to Corner Rock on the Colorado River, containing about seventy-five thousand acres of land, shall be set apart for an Indian reservation for the Indians of said river and its tributaries."

This action by Congress was based on the recommendation of Col. Charles D. Poston, superintendent of Indian affairs of Arizona Territory, and later Territorial Delegate from Arizona. It was at that time planned to bring together on this reservation all the Indians living on or near the Colorado River. In his report to the Commissioner of Indian affairs dated September 30, 1864, Colonel Poston stated:

"After a careful investigation of conditions among these Indians, it was determined to select a reservation for them on the bank of the Colorado and ask the Government to aid them in opening an irrigating canal, so they may become industrious and self-supporting. With this in view I spent some time in a personal examination of the different valleys along the Colorado from Fort Yuma to Fort Mojave, accompanied by a civil engineer, in whose experience and judgment the utmost confidence can be placed. * * * It is proposed to colonize some ten thousand Indians within its boundaries. * * * The rapid influx of population in this region renders it necessary that some provision should be made for the original inhabitants."

In the report of civil engineer A. F. Waldemar, appended to that of Colonel Poston, it is stated: "The cost of this canal would probably be less than $100,000. All this can only be ascertained by a systematic survey of the valley for that special purpose."

Primitive Indian agriculture.—The primitive agriculture of the Indians of the lower Colorado River Valley was extremely simple. After the usual annual overflow of the river, which normally occurs in May or June, they went upon the lands that had been lately submerged by the flood, and selecting such tracts as suited their purpose, planted corn, beans, melons, and pumpkins. Such crops

grew very rapidly, usually matured without further irrigation or cultivation, and for the most part were consumed as they matured. During the rest of the year the principal food was the beans of the mesquite tree, with such game and fish as were available. In years of no river overflow no crops could be grown, and the mesquite trees produced no beans; thus at such times there was much suffering if not actual starvation among them. The primitive Indians of the lower Colorado were thus practically dependent for their livelihood upon the annual overflow of the river, even as the Egyptians are dependent upon the overflow of the Nile, and hence the Colorado River is sometimes called the Nile of America.

Colonizing the Indians.—As recommended by Colonel Poston, it was the plan at this time to colonize all the Indians of the lower Colorado River and its tributaries on this reservation. In 1864 it was estimated there were 750 Indians on the proposed reserve. Later—about 1865 to 1871—some Indians from the Chimeheuvi and Mojave Valleys and the entire Hualapias Tribe (estimated at from 500 to 800) were "induced" to come to the reservation. The Hualapias, however, remained only so long as compelled to do so by the Army, and at the first chance returned to their old haunts, where they still live on a reservation later established for them.

Beginning of irrigation work by the Government.—The first appropriation for "constructing a canal for irrigation" on the Colorado River Indian Reservation was made by the following provision in the act of Congress of March 2, 1867 (14 Stat. 514). This legislation is also notable as marking the inception of efforts by the Government to reclaim and make useful for the purposes of man, the arid lands of the West. Irrigation had been practiced from times immemorial by some of the Indian tribes of the Southwest, but this was the Government's first venture in land reclamation by irrigation.

Act of Congress of March 2, 1867 (14 Stat. 514): For expense of collecting and locating the Colorado River Indians in Arizona on a reservation set apart for them by section 1, act of March third, eighteen hundred and sixty-five, including the expense of constructing a canal for irrigating said reservation, fifty thousand dollars.

Supplementary to the foregoing legislation was the act of July 27, 1868 (15 Stat. 222) and the act of May 29, 1872 (17 Stat. 188), providing $50,000 and $20,000 respectively, for "completing the construction of an irrigating canal on the Colorado River Reservation, Arizona."

First irrigation canal.—Work was begun on the first irrigation canal (since known as the Grant-Dent Canal), December 16, 1867. The plan, based on surveys made by Engineer Waldemar in 1866, called for an estimated expenditure, including a wing dam, of $150,000. The heading of this canal was about 500 feet upstream from the present pumping plant. Practically all labor was done by Indians, of whom more than 300 were regularly employed at 50 cents per day and rations. The work was done with hand shovels, the excavated earth being carried in baskets to its place in the canal banks.

Failure of first canal.—Water was first turned into the canal in July, 1870, but due to the unusually high stage of the river, and partial failure of the masonry headgate, too much water was admitted into it; and as a result the canal was partially destroyed, and a large area of land near the Indian agency was badly flooded and eroded. Repairs were afterwards made and the canal was used for about two months in the summer of 1871.

Second attempt.—As it was found by this time to be a practical impossibility to maintain the headgate at the site first selected, the canal, on the advice of Engineer C. E. Krause, was extended upstream for a distance of about 2 miles above the first heading, to "Corner Rock," a conglomerate rock formation on the east bank of the river, which is designated in act of March 3, 1865, as defining the northerly limit of the reservation as first established. This point has since been known as Headgate Rock. On this extension—begun in 1872—there were four tunnels aggregating 4,159 feet in length, a stupendous undertaking, considering the equipment and material available at that early day. Three of these tunnels, aggregating 3,819 feet, were in loose sand and gravel, and hewed cottonwood logs were used for lining them. The upper one, 430 feet long, was through the conglomerate rock formation of Headgate Rock. At its upstream end, opening into the river, there was placed a masonry portal with a wooden gate for controlling the water.

The Indians, who at this time were receiving only rations for their work, finally quit when their demand for pay was refused, and in August, 1873, it was found necessary to threaten them with the military arm of the Government in order to compel a resumption of the work.

Abandonment of Grant-Dent Canal.—This part of the canal was finally completed, and water was first turned through June 23, 1874. Within a few days, some of the tunnels were practically closed up by the failure of the wooden lining and consequent caving in of the loose sand and gravel. Repairs were made, and on June 24, 1875, water was again turned through, but the tunnels failed again within a few hours. On January 1, 1876, the repair of the tunnels was again started; but the funds were exhausted before the work was completed. This was the last attempt at irrigation by means of the canal from Headgate Rock.

Other attempts at irrigation.—During the years following 1876, at high stages of the river, some water occasionally entered the Grant-Dent Canal at the lower, or original heading, which was now without a headgate, this structure having been totally destroyed by floods. Numerous unsuccessful attempts at irrigation were also made by the use of water wheels, windmills, and various types of pumps—both steam and centrifugal—taking water from either the river or from wells. In 1899, a 15-inch centrifugal pump (capacity 5,000 gallons per minute), driven by a 40-horsepower steam engine, was installed, and with this a small school and agency farm, and a small area of Indian land was irrigated for some years. In 1909, the engine which was then practically worn out, was replaced by a new one of the same size. In 1910, 145 acres of school and Indian land were being intermittently irrigated by a more of less uncertain water supply afforded by this plant.

Cost of early attempts at irrigation.—The foregoing is a brief history of the irrigation activities on this reservation previous to the construction of the present project. None of this early work is of any benefit to the Indians of the present day. It is true that a small part of the Grant-Dent Canal was incorporated in the existing system; not, however, as an economy, as new work would have been less expensive, but because of an unavoidable conflict in location. In view of this it is believed that none of the expenditures for irrigation previous to the time of beginning the existing project is a fair and proper reimbursable charge against these Indians. It should be borne in mind that some among the early appropriations were for the purpose of collecting the Indians and inducing them to move to the Colorado River Reservation, as well as for irrigation purposes. As shown in the following tabulation compiled and approved by the Indian Office (irrigation division), the total expenditures for irrigation on the Colorado River Reservation for the years 1867 to 1910, inclusive, were:

For construction	$112,049.41
For maintenance	7,865.20
Total	119,914.61

Present irrigation project.—In September, 1911, construction of the existing pumping plant and irrigation system was begun with funds made available by act of Congress of April 4, 1910 (36 Stat. 273). At that time, one pumping unit (capacity, 50 second-feet) was installed. A second unit (capacity, 75 second-feet) was installed in 1918, when the canal system was extended to cover additional allotted lands.

In 1912 an allotment survey was made, and all Indians living on this reservation and all those Indians from the Fort Mojave and Chimehuevis Reservations who would consent to it were allotted 10 acres each of the land to be served by the pumping plant.

5. LOCATION, TRANSPORTATION, AND MARKETS

State.—Arizona (western Arizona on Colorado River).

County.—Yuma.

Townships.—4 to 10 north, ranges 19 to 22 west, Gila and Salt River bench mark and meridian.

Railroads.—The Phoenix-Los Angeles line of the Atchison, Topeka & Santa Fe Railway passes through the northern part of, and 8 miles of railroad is within, the reservation. The distance by rail from Parker to Phoenix is 160 miles; Parker to Los Angeles, 355 miles. There are four trains daily through Parker. The maximum distance of irrigated land from railroad shipping point is 11 miles; the average distance, 6 miles.

Highways and roads.—There are 13 miles of Phoenix-Parker State highway (graded and graveled) within the reservation. Highway traffic crosses Colorado River at Parker by ferry.

Cities and towns.—Parker (population, 500), on the Santa Fe Railroad and Colorado River, is the only town on the reserve. Needles, Calif., on the Santa Fe main line and Colorado River, is 70 miles north of Parker; Yuma, on the Southern Pacific and the Colorado River, is 105 miles south of Parker.

Markets.—Parker, Phoenix, Los Angeles, and near-by mining camps. Cotton is the principal product; there are two gins at Parker.

The Indian agency is near Parker. The project manager's office is at Los Angeles.

6. RESERVATION LANDS AND ALLOTMENTS

Area.—The area of the reservation as first established by act of Congress of March 3, 1865 (13 Stat. 559) was approximately 75,000 acres. The boundaries were subsequently changed in various ways by Executive orders of November 22, 1873; November 16, 1874; May 15, 1876, and November 22, 1915. The present area is 242,711 acres.

Classification of Indian Tribal Lands.—The approximate value of Indian and tribal lands is indicated by the following classifications:

100,000 acres irrigable by proposed works, $20 per acre	$2, 000, 000
6,000 acres irrigated land, $200 per acre	1, 200, 000
10,000 acres mesa land, $10 per acre	100, 000
Approximate total value of Indian and tribal lands	3, 300, 000

The remainder is classed as mountainous and waste land.

Allotments.—In 1912, under the provisions of the act of March 3, 1911 (36 Stat. 1063), allotments of 10 acres each were made to the Indians of the reservation regardless of age or sex. Some Indians of the same tribe, the Mojaves, living on the Mojave Reservation near Needles, Calif., and some of the Chemehuevis also accepted allotments. Since then, others, including children born since the first allotment, have been tentatively allotted on the Colorado River Reservation, but these later allotments have not been approved. Some of the Indians first allotted are deceased, but their allotments have not been sold. At present there are 748 approved allotments and 392 tentative allotments or selections.

Trust patents.—All allotments are under trust patent. No land on the reservation is in white ownership aside from town lots in the town site of Parker, which was opened by sale in 1906, when the railroad was completed to Parker.

7. POPULATION AND HEALTH CONDITIONS

Whites.—On reservation, 600; in Parker, 500; lessees, 35.

Indians.—Population of reservation, 572; Indian tribes, Mojave and Chemehuevi; full bloods, 514; mixed bloods, 58; families on reservation, 183; families in permanent homes, 183; cases of tuberculosis, 138; trachoma, 106; Indian births, 15 (1926); deaths, 13 (1926); Indians receiving rations, 35.

8. CLIMATE

Period covered by records, 1912 to 1926.
Range in elevation of irrigable area, 320 to 358 feet.
Maximum temperature, 122°; minimum temperature, 17°.
Average maximum temperature, 100°; average minimum temperature, 45°.
Average annual precipitation, 4 inches; no snow.
Average date last killing frost (spring), February 15.
Average date first killing frost (fall), November 15.
Average growing season, 270 days.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

Topographic survey.—A plane-table topographic survey (scale, 400 feet to 1 inch; contour interval, 1 to 2 feet) of about 8,000 acres, including most of the land embraced in the present project, was made in 1912. A similar survey (same scale and contour) was made in 1919 and 1920 to cover all the lands that may be included in the probable ultimate irrigation development of the reservation, a total area of about 120,000 acres.

Topography.—While occasional areas of a few acres each have a fairly smooth surface and require but little leveling, about three-fourths of the land has a

rough and uneven surface as the result of wind or water erosion. There are also numerous sloughs and occasionally some sand dunes. All land, even the smoothest, requires considerable work before it can be irrigated properly. Preparing the raw land for irrigation—clearing, leveling and bordering—involves an expenditure of about $25 an acre for the lands requiring the least labor, about $125 an acre for the roughest, and about $75 an acre for the average. The cost of clearing, most of the land having a heavy growth of mesquite and other vegetation, varies from $15 to $75 per acre.

Soil.—The soils of the lower Colorado River bottom lands are the well-known river silts, varying in texture from medium fine sands and sandy loams next to the river, to the finest silt loams and silt clays near the foothills. The sandy and silt loams predominate and are very fertile. The lowest lands, always found next to the foothills, are usually of extremely fine silt and clay mixtures.

Drainage.—The lands near the river, for the most part, have a sand or sandy subsoil and are easily drained. The land next to the foothills, having a silt-clay soil and subsoil, is, in general, impregnated with alkali.

As a result of inadequate drainage about 3,000 acres of land under the present canal system, of which about 1,500 acres were formerly cropped, are now unfit for use. This condition is rapidly spreading to other lands; and, if not remedied by drainage, all the land north and east of the north-south half section line through sections 22, 27, and 34 of township 9 north, range 21 west (about 4,000 acres), will soon be unproductive and worthless and will have to be abandoned, in which case the money spent in leveling and improving the land and putting up buildings will be a loss. Many of the Indians who formerly lived on this part of the project have abandoned their lands and moved onto new land, tentative selections or allotments made by the superintendent but not approved by the bureau, in the southern part of the project.

10. WATER SUPPLY AND WATER RIGHTS

Water for this project is taken from the Colorado River, which will also be the source of the proposed gravity project of approximately 100,000 acres. The diversion for the present project, taken from the river by the pumping plant, ranges from 75 to 150 second-feet, depending on the stage of the river while the plant is in operation. The water used during the period 1922 to 1926, inclusive, is shown by the following tabulation:

	1922	1923	1924	1925	1926
Acre-feet for season	15,343	18,619	25,435	25,998	32,963
Acres irrigated	2,806	3,914	4,480	5,288	6,076
Acre-feet per acre	5.5	4.8	5.7	4.9	5.4

Water rights.—The appropriation act of August 24, 1912 (37 Stat. 523), and subsequent legislation concerning the Colorado River Reservation provides that the appropriation is "for the purpose of establishing a water right for the Colorado River Reservation." It is believed that all land to be included in the proposed gravity project which is not now under irrigation will and should be required to pay its pro rata share of the cost of constructing the upstream storage necessary for flood control and water supply.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

First plan.—The plan first formulated as outlined in the report of Engineer A. F. Waldemar in September, 1864, contemplated the colonization of about 10,000 Indians on the proposed reservation and the irrigation of about 75,000 acres of land to enable the Indians to become self-supporting and prosperous. This was before the reservation was established and in fact the then seemingly apparent simplicity and ease of constituting such a project at this particular place as compared with other locations along the lower Colorado River was the controlling factor in the selection of the area that was reserved for the Indians.

The construction of the first canal, begun in 1867, and its failure are described in the history of this reservation.

The total expenditure on these early efforts at irrigation, 1867 to 1910, inclusive, was $119,914.61.

Plan of existing project.—The existing irrigation project consists of a pumping plant, taking water from the Colorado River, and a distributary system irrigating 3,920 acres (season of 1926), which was begun in 1911, as provided for in act of Congress of April 4, 1910, and subsequent legislation. At that time one pumping unit of two 20-inch centrifugal pumps having an average capacity of 50 second-feet under heads ranging from 7 to 18 feet operated by a 150-horsepower steam engine was installed. The building, a permanent concrete structure, was of sufficient size to accommodate a second pumping unit when needed. This second unit, a 36-inch centrifugal pump with an average capacity of 75 second-feet operated by a 225-horsepower steam engine, was installed in 1918, when the canals and laterals were also enlarged and extended. On this project there has been expended to June 30, 1927, for construction $498,360.29 and for operation and maintenance $408,355.25, or a total of $906,715.54.

Plan for proposed project.—The ultimate irrigation development of the Colorado River Reservation contemplates the irrigation of about 100,000 acres of productive land, including that now already irrigated by the pumping plant, and about 10,000 acres of mesa land, the bottom land to be served by a gravity project and the mesa land by a pumping plant. The estimated acre cost of this development is $70. In addition, the land served by this development will probably be required to pay its pro rata share of the cost of storage both for flood prevention and water supply, which it is contemplated will be developed on the Colorado River in the comparatively near future. Surveys and investigations for the gravity project as provided for by act of Congress of May 25, 1918, were completed, and a report prepared in 1920. At that time early construction of the project was given some consideration, as a means of increasing the productive area of the country, as a war measure. Early completion being then considered as of the greatest importance, the plan discussed in the report of 1920 involves a diversion at Headgate Rock by a weir and canal heading somewhat similar to that of the Yuma project. If and when this project is built, however, the feasibility of a dam of approximately 100 feet in height at Empire Flat, to serve for desilting and for power, as well as for diversion purposes, should be thoroughly investigated. Recent experience of the Bureau of Reclamation in successfully building high dams on foundation materials formerly considered unsafe indicates that a dam of this height in all probability may be feasible at the Empire Flat site. The gravity project should not be built until after the adoption and partial completion of a program for flood control on the Colorado River, which for some years has been receiving so much attention, as river control will greatly reduce the cost of the levee system necessary for protecting the lands from overflow.

12. Summary of project works

Canals and laterals:	
Miles of canals, 100 to 250 second-feet	10
Miles of canals, 30 to 100 second-feet	10
Miles of canals, 15 to 50 second-feet	42
Total	62

Miles of canals and laterals per acre irrigated, 0.0135.

Canal or irrigation structures.—One desilting basin, 48 lateral headgates (concrete); 40 bridges, 48 culverts; 284 farm turnouts (wood), levees 7.6 miles; drains, 25 to 50 second-feet, 9 miles; telephone lines, 3 miles; stations, 4.

Buildings.—One pumping plant, 4 residences, 1 warehouse and garage.

13. AREA AND UTILIZATION OF ARABLE AND IRRIGABLE LANDS

(*a*) *Utilization of Government project lands (entire project)*

	1924	1925	1926
1. Acreage arable [1]			
2. Acreage irrigable [1]			
3. Acreage irrigated	4,778	5,459	5,921
4. Acreage cultivated	4,605	5,256	5,712
5. Total crop value [2]	$359,993	$430,774	$348,525
6. Average crop value	92.00	78.91	58.86
7. Indians farming	60	70	78
8. Lessees farming	30	32	35
9. White owners farming			

[1] Acreages arable and irrigable not definitely fixed as project is being extended from time to time to include new lands in lieu of land abandoned as worthless because of seepage.

[2] Total crop values include crops on school and agency farm of 60 acres.

(b) *Utilization of land owned by Indians and not leased (Government project) farmed by Indians*

	1924	1925	1926
1. Acreage arable [1]			
2. Acreage irrigable [2]			
3. Acreage irrigated	1,681	1,896	2,305
4. Acreage cultivated	1,529	1,726	2,131
5. Families farming	60	70	78
6. Cultivated per family	25.5	24.6	27.3
7. Total crop value	$73,366	$109,596	$91,542
8. Crop value (acre)	50.40	59.60	41.24
9. Crop value (family)	$1,223	$1,566	$1,174

(c) *Utilization of land owned by Indians and leased (Government project) farmed by lessees*

	1924	1925	1926
1. Acreage arable			
2. Acreage irrigable [2]	3,500	3,600	3,856
3. Acreage irrigated	3,097	3,563	3,615
4. Acreage cultivated	3,076	3,530	3,581
5. Number of lessees	30	32	35
6. Total crop value	$283,629	$315,960	$256,983
7. Crop value (acre)	$95.40	$86.90	$70.10

[1] Acreages arable and irrigable not definitely fixed as project is being extended from time to time to include new lands in lieu of land abandoned as worthless because of seepage.
[2] Total area of irrigable land covered by leases.

14. DETAILED CROP PRODUCTION AND RETURNS (GOVERNMENT PROJECT)

(a) *Entire project, Indians and lessees (season 1926)*

Crop	Acreage	Average yield per acre	Average price per unit	Average return per acre	Total value
Cotton	4,601	0.77 bale	$70.00	$53.62	$231,020
Alfalfa	785	6 tons	15.00	90.00	70,650
Pasture	208	do	30.00	30.00	6,240
Milomaize	177	5 tons	20.00	100.00	17,700
Indian corn	37	20 bushels	.70	14.00	518
Miscellaneous	33			72.64	2,397
Total for project	5,921			58.80	348,525

(b) *Indian farmers*

Crop	Acreage	Average yield per acre	Average price per unit	Average return per acre	Total value
Cotton	1,680	0.45 bale	$70.00	$31.40	$52,990
Alfalfa	314	6 tons	15.00	90.00	29,260
Pasture	174		30.00	30.00	5,220
Maize	23	5 tons	20.00	100.00	2,300
Corn	33	20 bushels	.70	14.00	462
Miscellaneous	31				1,530
Total	2,255			41.24	91,542

(c) *Lessees (includes agency)*

Crop	Acreage	Average yield per acre	Average price per unit	Average return per acre	Total value
Cotton	2,992	0.946 bale	$70.00	$66.22	$198,130
Alfalfa	471	6 tons	15.00	90.00	4,239
Pasture	34	5 tons	20.00	30.00	1,020
Maize	154	do	20.00	100.00	15,400
Miscellaneous	15				38,194
Total	3,666			70.10	256,983

15. Economic conditions among project farmers (Indians)

	1924	1925	1926
(1) Indian families farming	60	75	78
(2) Livestock:			
Horses	150	300	300
Cattle, beef	1,540	650	650
Cattle, dairy	5	6	6
Sheep			
Hogs			
(3) Estimated value livestock per farm	$240	$240	$240
(4) Equipment:			
Plows		75	78
Mowers		35	40
Autos		50	50
(5) Estimated value equipment per farm	$160	$190	$192
(6) Average crop value per family	$1,223	$1,566	$1,174
(7) Construction assessment (acre)	$4.00	$4.00	$4.50
(8) Operation and maintenance assessments (acre)	None.	None.	None.
(9) Acreage Indian land leased	3,500	3,600	3,856
(10) Approximate total land rental paid to Indians	$9,609	$12,929	$11,997
(11) Number Indians receiving payments from agricultural and grazing leases	150	200	200
(12) Average capital payment from above sources		$50	$50
(13) Indian reimbursable indebtedness beginning fiscal year	$31,083	$24,839	$14,078
(14) Amount paid on reimbursable indebtedness (not including irrigation)	$6,244	$10,761	$2,525
(15) Number Indians receiving rations		50	56

16. PROJECT OPERATION AND MAINTENANCE

(a) *Organization.*—The following employees are engaged on maintenance and operation work on Colorado River Reservation:

	Salary
P. B. Edson Skiff, project manager	$2,800
Olin J. McCleery, watermaster	1,860
John S. Ryder, chief station engineer	1,860
Ross E. Doran, station engineer	1,680
Chester Barrington, station engineer	1,680
Ernest B. McCleery, dredge engineer	$7 per day.

Quarters are furnished in addition to salary to the above employees with the exception of the project manager and dredge engineer.

Three to five ditch riders are employed for about 9 months each year. Indians furnishing their own horses are employed at $100 to $120 per month. Each rider covers about 1,500 acres of territory riding from 10 to 30 miles per day.

(b) *Annual Expense.*—The total operation and maintenance and incidental construction cost for 1926, $36,330.90.

The following statement of costs for 1927 shows about an average distribution of costs.

Construction:	
Canals	556.69
Structures	3,674.49

Operation and maintenance—pumping plant:	
Administration	1, 913. 87
Superintendence	5, 074. 17
Labor	1, 815. 50
Engineering	709. 71
Fuel	5, 764. 71
Transportation	2, 903. 50
Auto expense	254. 16
Material and supplies	1, 232. 73
Miscellaneous	688. 24
Refund on previous year transportation charge (credit)	111. 35
	20, 467. 94
Distributing system	14. 800. 62

17. PROJECT FINANCES

(*a*) *Summary of appropriations, authorizations, and disbursements.*—For this summary see appendix immeidately following section 14, project finances.

(*b*) *Total expenditures and expenditures by various projects to June 30, 1927.*

(1) Grant-Dent Canal and other projects previous to present project	[1] $119, 914. 61
(2) Present (pumping) project	[1] 795, 271. 94
(3) Proposed gravity project (surveys)	[1] 108, 868. 34
	1, 024, 054. 89

[1] These items only approximate. In data supplied advisers total expenditures are variously given ranging from $1,031,362.87 to $1,050,684.03, the discrepancy being explained by the statement: "Either the costs as shown on the photostat" (apparently data supplied by the Washington office) "are too much, or there has been spent funds of which there is no record in the Los Angeles office."

(*c*) *Construction cost, present project to June 30, 1927*

Reimbursable money expended	$307, 306. 57
Indian tribal (reimbursable) money expended	91, 374. 14
Total expenditures to June 30, 1927	398, 680. 81
Less inventory (equipment, etc.)	11, 764. 02
Construction cost to June 30, 1927	306, 916. 09
Approximate estimate cost to complete (advisers' estimate, probable cost of drainage)	203, 000. 00
Estimated cost, completed	590, 000. 00
Acreage now irrigable [1]	6, 000. 00
Irrigable when completed (i. e., if and when abandoned land reclaimed by drainage [1]	9, 000. 00
Acre cost to date (6,000 acres)	64. 50
Acre cost with drainage (9,000 acres)	65. 00
Value raw land without irrigation	5. 00
Value raw land under irrigation	25. 00
Value improved land under irrigation [1]	200. 00

(*d*) *Construction cost assessments and collections.*—Construction charges are not being collected on Indian land farmed by Indians themselves. On all leases made subsequent to January 1, 1925, the superintendent in accordance with instructions contained in Indian Office letter of March 5, 1924 has incorporated a provision requiring the repayment of construction charges on all leases of Indian agricultural land at the rate of from $1 to $4.50 per acre annually.

[1] The area of this project is not fixed, but varies from year to year as seeped of alkalied land is abandoned or the canals are extended to take in additional lands. The first proposal (1911) was to build a project of 5,000 acres. Canals have now been extended over an area of 10,000 acres and in the data supplied the advisors the irrigable area is variously given, ranging from 5,087.04 to 6,108.4.

Statement as to collections for present project, not including early work:

Construction cost to June 30, 1927	$386, 916. 69
Construction charges due to June 30, 1927	137, 349. 00
Construction charges paid to June 30, 1927	14, 341. 00
Construction charges due and unpaid June 30, 1927	123, 007. 94

Annual acre construction assessment $1 to $4.50 as specified in leases made by superintendent.

(e) Operation and maintenance cost to June 30, 1927

Reimbursable money expended	$336, 490. 69
Operation and maintenance collectons expended to date	71, 864. 56
Total operation and maintenance cost to June 30, 1927	408, 355. 25

(f) Operation and maintenance assessments and collections.—Operation and maintenance charges are assessed on leased land only and in accordance with provisions contained in the various leases. The rate now in effect varies from $3 to $6.50 per acre annually. No operation and maintenance collections are being made on Indian land that is not leased. Operation and maintenance assessments of about half of the leases now in effect are made in December for the following season and on the other leases charges are collected at the end of the season.

Total operation and maintenance assessments made to date [1]	$96, 197. 61
Total operation and maintenance collections made to date	95, 309. 31
Balance due and uncollected to date	833. 35
Penalty on delinquencies	None.

(g) Operation and maintenance assessments and collections for fiscal years 1925 to 1927, inclusive

	1925	1926	1927
Assessment (acre)	$3. 00	$3. 00	$3. 00
Collected on Indian land	None.	None.	None.
Amount assessed on Indian land leased	9, 609. 86	12, 928. 75	17, 565. 07
Amount collected	9, 609. 76	12, 927. 75	16, 677. 82
Total amount assessed (year)	12, 700. 02	16, 829. 50	26, 136. 24
Total amount collected (year)	6, 732. 39	19, 689. 70	21, 218. 74
Amount due and uncollected	. 10	1. 00	887. 25
Rate of penalty on delinquencies	None.	None.	None.

(h) Total irrigation cost to date

Total construction cost (net)	$386, 916. 69
Total operation and maintenance cost	408, 355. 25
Total irrigation cost	795, 871. 94
Construction cost repaid	14, 341. 06
Operation and maintenance cost repaid	95, 309. 31
Total repayment	109, 650. 37
Total repayments due	233, 546. 66
Total repayments due and unpaid	123, 896. 29

[1] Annual operation and maintenance assessment per acre $3 to $6.50 as specified in lease.

Appropriations and disbursements for irrigation purposes, 1865 to 1910, inclusive

Date and purpose of appropriation, act, or authority	Amount of appropriation or authorization	Amount disbursed
Mar. 3, 1865, incidentals in Arizona	$12,900.00	$3,008.10
Mar. 2, 1867, collecting Indians and building irrigation canal	50,000.00	50,000.00
July 27, 1868, collecting Indians and building irrigation canal	50,000.00	49,323.58
May 29, 1872, completing irrigation canal	20,000.00	
Various acts and authorities 1875 to 1910 for irrigation	16,040.89	16,040.89
1910	1,542.04	1,542.04
June 30, 1913	25,000.00	25,000.00
Aug. 1, 1914	15,000.00	15,000.00
Mar. 4, 1915	15,000.00	15,000.00
May 18, 1916	15,000.00	15,000.00
1912 to 1917 authorizations	16,723.45	16,723.43
1917 (collections)	494.50	494.50
March, 1917	15,000.00	15,000.00
Collections	15,990.74	15,749.03
Miscellaneous authorizations and collections, 1917	23,016.76	23,016.76
May 25, 1918	20,000.00	19,300.06
Do	50,000.00	43,346.39
Collections	3,943.98	2,925.74
Indian moneys, proceeds of labor, 1919	6,985.96	6,985.96
Various authorities, 1919	6,441.61	6,441.61
Various authorities 1919	4,016.93	4,016.93
June 30, 1919	11,000.00	10,849.76
Do	82,000.00	81,893.50
Do	41,000.00	40,620.35
Various authorities 1919, including some collections	12,834.48	14,093.65
June 30, 1919	54,000.00	53,056.96
Various authorities, 1919	8,409.52	8,569.57
Feb. 4, 1920	50,000.00	49,434.40
Do	36,000.00	35,253.10
Various authorities and collections	13,270.27	13,469.14
Mar. 3, 1921	50,000.00	38,100.11
Do	36,000.00	29,733.32
Various authorities	8,696.37	5,260.95
May 24, 1922	30,000.00	6,931.52
Maintenance and operation	35,000.00	33,271.08
Various sources, collections, etc	9,486.20	5,780.84
Jan. 5, 1924, irrigation	20,000.00	3,836.70
June 5, 1924, maintenance and operation system (reimbursable)	35,000.00	34,371.57
Dec. 6, 1924, maintenance and operation	1,800.00	953.04
Collections, etc., 1924	23,964.10	10,765.57
Maintenance and operation, irrigation 1925	10,000.00	9,787.93
Irrigation	5,000.00	3,836.41
Industrial school support	4,626.70	4,626.70
Irrigating Indian Reservations	3,717.15	3,717.15
Collections	26,120.66	16,458.57
Support and civilization of Indians	2,333.32	2,333.32
Maintenance and operation, irrigation, 1926	10,000.00	7,535.77
Irrigation Colorado River (reimburseable)	5,000.00	4,477.80
Collections	31,995.54	40,490.20

NOTE.—On the 1923 photostat the construction cost is shown as $13,738.25, inventory adjustment $4,646.89, making a total of $18,385.14. As there was no other construction fund and $23,070.82 was returned to the Treasury the total construction cost as shown on the photostat appears to be in error by $11,455.96 for 1923 and $7,865.20 as shown before. The costs as shown on photostat should be decreased $19,321.16.

At end 1926 photostats (Washington office data) show a total cost of:

Pumping plant	$925,950.57
Gravity surveys	108,868.34
Costs not irrigated	14,865.12
	1,050,694.03

18. PROJECT DEFECTS, PROBLEMS, AND COMPLAINTS

Drainage.—The most serious problem in connection with this project, and one that should have received attention long ago, is the drainage problem. Every day that action looking to the solution of this problem is delayed or evaded, is simply adding to the expenditure that will ultimately be required for a drainage system, as the affected area is continually spreading and will continue to spread until drainage is provided.

The necessity for drainage should have been easily apparent at the time of initiating the project, and it should have been provided as an essential part of the project. In the files are numerous letters and reports relating to the necessity for drainage; but the matter has never received serious consideration—at least to the extent of providing an appropriation for doing the work. The justification for delaying action for a time—and it seems a reasonable one—was the probability of building the gravity project at an early date. As the proposed gravity project will embrace the present project, the drainage system of that project would serve as an outlet for the drainage from the area now irrigated. Since, however, the gravity project, in all probability, will not be built until after the initiation of a comprehensive plan for flood prevention and water supply on the Colorado River, which will necessarily be some years in the future, it would seem advisable, in view of existing conditions, to build a drainage system for the existing project.

Within a year or two after its first irrigation, much of the land was seriously affected by alkali. This condition, at first affecting only a small area, has rapidly extended over surrounding areas, until at present about 3,000 acres of otherwise arable land in the project, is so badly affected as to be worthlesss. Of this 3,000 acres, about 1,500 acres were formerly cultivated, but is now practically or wholly abandoned. The Indians or the lessees who cleared, leveled, and improved this land at an expense of $25 to $125 an acre, have been forced out by the hopeless struggle after farming the land for from 3 to 5 years, with constantly diminishing returns.

In addition to the cost of improving the land, there should also be taken into consideration the fact that on many of the Indians' allotments houses were built by the Government under a reimbursable plan. It is probable that some of these are not paid for and the justice of requiring the Indians to pay for them when the farms on which they are situated have had to be abandoned because of alkali is questionable.

In lieu of the lands thus abandoned, the Indians have been given tentative allotments of land outside of the original limits of the project, to which the canals have been extended from time to time as required. On the land thus added to the project, the Indian or lessee must begin all over again—that is, he has to clear, level, and improve the land, build fences and field ditches, and a house if he cares for a place to live. Within a few years, conditions here will be just as they are now on the land he first abandoned. In the meantime, the expense of building, maintaining, and operating the ever lengthening canals necessary to serve the lands will constantly be increasing and levees necessary to protect the land from overflow of the river will be constantly increasing in in length and height, and the distance to the railroad shipping point will be growing greater and greater. If the present practice is continued, that is, extending the project to include new lands as rapidly as the older improved lands are abandoned because of alkali, the time will eventually come when practically the entire valley will be alkalied and worthless.

As the result of extending the project to take in new lands in lieu of abandoned lands, the area now under canals—that can be served by the irrigation system—including the alkalied land, is about 9,000 acres. It is the opinion of the advisors that a drainage system can be built with little or no increase in the acre construction cost if the cost of drainage is prorated to the 9,000 acres, or the total area benefited. This is accounted for by the fact that at present the construction cost, for the purposes of making repayment assessments, is prorated to approximately 6,000 acres, or apparently the acreage considered productive. As described in the foregoing, however, this productive area is constantly moving southward as new lands are included in the project in lieu of those abandoned.

Leasing.—The policy of leasing Indian land in cases where the Indian allottee is physically or financially unable to farm the land himself, was begun in 1916. These leases are made for periods of 5 to 10 years. The lessee takes the raw or unimproved land and is given the use of it for a certain term of years in consideration for his labor and expense in clearing and leveling and improving the land. There is a lack of uniformity in the conditions stipulated in leases made at various times by various superintendents. Apparently the effort has been to exact the most favorable conditions possible from the prospective lessee. In the leases first made, the annual water rental or operation and maintenance charge ranges in various leases from $2 to $3 for 4 acre-feet and from $1 to $1.50 per acre-foot for any water used in addition to the first 4 acre-feet. In all leases made since 1924 the annual water rental charge has been increased to

$6.50 for 4 acre-feet and $3.25 per acre foot for excess water. These prices, your advisors consider exorbitant. In addition to the operation and maintenance charges, the lessee is required to pay an annual construction charge ranging from $1 to $4 per acre. It is thus seen that some of the lessees are paying as much as $10.50 per acre irrigation charges and if they should use more than 4 acre-feet or water during the season, the charge would be considerably in excess of this amount. In addition to the irrigation charge, the lessee pays a land rental of $1 to $10 per acre on improved land. The land rental is turned over to the Indian or credited to his reimbursable indebtedness.

Taking into consideration the great expense involved in clearing and improving this land, which ranges from $25 to $125 per acre, the fact that it is menaced by overflow from the river for several weeks during each season, the protective levees being inadequate and insecure, and the further fact that much of the land becomes unproductive in from three to five years after being placed under irrigation, it is believed that the lessees on this project are paying more for their irrigation charges than is just and equitable. In addition to the disadvantages just mentioned, there is the lack of good roads and the absence of schools to be taken into consideration. Some of the lessees, particularly those who first went to the project, have lost heavily. It is reported that the Russell Bros. have lost approximately $100,000 and that the L. V. Brown Cotton Co. lost $200,000 on their lease. The loss of the cotton company, of course, was largely due to the drop in the price of long staple cotton at the end of the war.

Operation of desilting basin.—It was noticed at the time of the visit of your advisors that the desilting basin was not functioning for the reason that it had become filled with silt and was thus useless. Upon inquiry as to why it was not sluiced out as intended, we were informed by the stationary engineer that the water master had given orders not to sluice the basin until the cost of the run which is the period required for one irrigation and ordinarily is from 5 to 10 days. It is suggested that the desilting basin be sluiced at such intervals as necessary so that it will properly perform its intended function.

An element of personal feeling existing between the water master and the stationary engineer was commented upon by several of the lessees and a few of the Indian farmers who were considerably exercised, as it was felt this ill feeling had interfered with the proper operation of the irrigation system in the past and that it would do so again in the future with the possibility of entailing considerable loss to the farmers as the result of unsatisfactory water service.

Irrigation on Colville Reservation, Washington

1. RECOMMENDATIONS

There is no pressing need for further development on this reservation at the present time and until the Indians take care of the acreage already under irrigation and make better use of it than they have thus far, it is recommended:

1. That all further construction be suspended.
2. That the operation and maintenance of the works now constructed and under the control of the irrigation branch be turned over to the superintendent of the agency for operation.
3. That those using the irrigation system be required to keep it in repair, largely by contributing labor.
4. That the Government's contribution to the maintenance of the project shall be limited to the furnishing of material for the construction of minor turnouts or gates and renewal of structures.
5. That the present construction and operation and maintenance costs be held in a suspended account pending further development when and if conditions justify further construction in the future.
6. That the delinquent construction charges and advances made for operation and maintenance on lands sold to whites under the West Okanogan irrigation district be promptly collected, or legal steps taken to enforce collections.
7. That due to these collections being on land outside of the reservation, and the interest of the Indians having been extinguished, the collections of these irrigation charges be transferred from the superintendent of the Colville Agency to the supervising engineer of that district.
8. That an effort be made to sell the remaining acreage of Indian lands under the West Okanogan irrigation district.

2. SYNOPSIS

The Colville Reservation was established by the treaty of July 7, 1883, which was approved by Congress on July 4, 1884. When established the reservation covered an area of approximately 2,887,000 acres, but was diminished to approximately half this size by the act of Congress approved March 22, 1906. The Columbia River runs on the south and east of the reservation, and the Okanogan forms the western boundary. These rivers run in comparatively deep canyons from which the land slopes in successive benches. The Great Northern Railroad runs along the west boundary and 20 miles east of the reservation, and the Northern Pacific 20 miles south. The principal highways are the Sunset Highway 20 miles south, the Caribou Trail, along the west boundary, and the State road, from Republic to Spokane, through the San Poil Valley. The principal towns are Nespelem, Omak, Inchelium, Wilbur, Almira, and Republic. The markets are largely local and northwest.

Reservation lands and allotments.—Moses agreement allotments were made by Executive order of May 1, 1886, and other allotments were made between 1910 and 1916, all children living at that time being allotted. All Indians were allotted 60 acres agricultural or 160 acres grazing land. The Moses agreement allotments were of several hundred acres, but these allotments are now located off the reservation.

A total of 3,133 allotments covering 378,903 acres have been made, for which 833 fee patents, covering 85,471.97 acres have been granted. One hundred and seventy-two allotments, totaling 19,768.1 acres have been sold for $466,103.63, or $23.60 per acre.

Population and health conditions.—The Indian population on this reservation is 2,917, there being 1,365 full bloods and 1,552 mixed bloods. There are 6 cases of tuberculosis and 13 cases of trachoma. In 1926, there were 104 deaths and 130 births.

Climate.—Range in elevation 1,000 to 2,500 feet; maximum temperature 100°; minimum 25°; average precipitation 14 to 15 inches; average growing season 160 days.

Topography, soil, and drainage.—Topographic maps were made in 1913. The land slopes from 30 to 100 feet to the mile on the Little Nespelem project and from 40 to 125 feet to the mile on the Nespelem project. On the little Nespelem project the soil is described as light clay, with approximately 1,600 acres of the land alkalied, while on the Nespelem project it is partly made up of erosion from surrounding hills with some sand and graveled covered with a sandy loam, and partly of volcanic ash soil mixed with fine sand and underlaid with light clay. There is no evidence of alkali on the Nespolem project. The furrow system of irrigation is used, with practically continuous flow, excepting that water is turned off for harvesting crops and heavy rains. The duty of water has been estimated at two acre-feet on the Little Nespelem project, and three acre-feet on the Nespelem project, in addition to 16 inches rainfall. The principal crops are alfalfa and grain, at an estimated value of $50 and $40 respectively.

Water supply and water rights.—On the Nespelem project, the source of the water supply is the Nespelem River, which covers a watershed of approximately 122 square miles. The average annual run-off was reported as 29,112 acre-feet. A storage reservoir is contemplated which will hold approximately 10,000 acre-feet and it is estimated that by storing in this reservoir and using the natural flow of the stream, there will be an ample supply of water for 8,000 acres of land. Water is now diverted from the Nespelem River by two ditches, namely the agency ditch and the Nespelem ditch. All of the low-water flow is diverted through these canals.

On the Little Nespelem project, the source of the water supply is the watershed of the Little Nespelem River. A storage reservoir was constructed by placing a concrete dam across the Owhi Lake outlet, which reservoir stores the entire flow of the watershed above it, having a capacity of approximately 5,000 acre-feet. The storage in this lake, together with the run-off below, furnishes between 3,000 and 3,500 acre-feet annually. Water is diverted through a single canal from the dam across the outlet of Owhi Lake.

On other miscellaneous projects on the reservation, the water supply is as follows: For the San Foil project, the San Foil River, the natural flow of which is sufficient for the irrigation of the 1,000 proposed to be irrigated; for the Hall Creek project, it is intended to use the natural flow of Hall Creek and storage in Twin Lakes, which will have a storage capacity of 900 acre-feet each, and this, together with the natural flow in Hall Creek, will constitute the supply to irrigate

10,000 acres. Stranger Marsh and Barnaby Creek project will also derive water from the same sources.

The proposed Omak and Aster pumping plants will obtain water from the Okanogan River, which is ample at all times.

General plan of irrigation development.—As originally contemplated, this project included what is now the Nespelem and Little Nespelem units. The original plan included a storage reservoir on the Nespelem River with a capacity of 1,222 acre-feet and the conversion of Owhi Lake into a storage reservoir with a capacity of 5,000 acre-feet. The construction of the reservoir on the Nespelem River has not been started owing to lack of interest of the Indians in irrigation; however, two ditches have been constructed to divert the natural flow of the stream. The reservoir contemplated on Owhi Lake has been completed and furnishes between 3,000 and 3,500 acre-feet annually.

On the San Poil River there are approximately 1,000 acres susceptible of irrigation, for which there is ample water supply.

The principal units on this project, with their present and proposed acreages susceptible of irrigation and per acre cost, are as follows:

Units	Estimated cost	Proposed irrigable	Present irrigable
Little Nespelem	$12.00	2,000	1,500
Nespelem	30.00	10,000	1,500
Ball Creek	20.00	10,000	----------
Wilmot Creek	70.00	1,440	----------
San Poil	15.00	1,000	(1)
Omak pumping plant	33.00	1,973	----------
Aster pumping plant	15.25	1,751	----------
	36.95	900	

[1] Not completed.

Summary of project works.—On the Nespelem project all structures are small and of wooden structures, being 40 in number. There are 14 10-foot bridges and 1 wooden flume 3 by 5 feet. Water is diverted through the agency and Nespelem ditches. There are no drainage canals.

On the Little Nespelem project the project works consist of Owhi Dam, storage capacity 5,000 acre-feet. Water is diverted through a single canal from this dam across the outlet of Owhi Lake.

Area and utilization of lands.—The estimated acreage of arable land that will be irrigable if and when the project is completed as proposed is 12,000 acres; acreage now possible to irrigate, that is, provided with irrigation facilities, is 3,000 acres, of which only 483 acres are actually irrigated. All of the irrigated acreage is in cultivation.

The acreage of Indian-owned land not leased, under canal, is 2,898, of which the Indians irrigated only 216 acres. The entire irrigated area was in cultivated crops. There are 26 families farming, the average acreage cultivated by each family being approximately 8 acres.

Eighty acres of land, all of which is irrigable, are owned by whites. Of this acreage 29 acres are irrigated and cultivated. There are eight lessees farming 238 acres of Indian-owned land.

Principal crops, yields, and returns.—On 483 acres cultivated on this entire project, the principal crops were 257 acres of alfalfa, total value $10,280; 40 acres of garden, total value $2,025; 40 acres of oats, total value $1,200; and 66 acres wheat, total value $2,500. Total crop value for 1927 was $18,080; average crop value $37.

Economic conditions among project farmers.—On the Little Nespelem unit there there are eight Indians farming; they own $2,305 worth of stock, fowls, and bees. Very few Indians pay operation and maintenance charges. On the Nespelem project the estimated value of livestock per farm is $650, and value of equipment per farm is $203. Grain is the only cash crop raised, and it costs $15 to $20 per ton to freight it to the railroad, 40 miles away.

Construction costs and collections.—The total construction costs to June 30, 1927, are $165,342.49. No construction assessments have been made on any of the units except the West Okanogan. The collections are handled by the reservation superintendent, and $3,989.16 has been collected as partial repayment of $95,000 expended on this unit.

Operation and maintenance costs and collections.—Total operation and maintenance costs to June 30, 1927, are $50,837.25; assessments, $2,196.79; delinquent assessments, $1,322.27; collections, $874.52, of which $48.02 was from Indians and $826.50 from white owners and lessees.

Area possible to irrigate, approximately 3,500 acres, is used as the basis for computing operation and maintenance assessments, which are made annually. Collections are due on or before delivery of water, and are supposed to be enforced by nondelivery of water, but this ruling is not enforced on the Indians. With more land leased under improvement leases, it would be brought under irrigation, and better farming instructions for Indians would make the project self-supporting. The operation and maintenance rate on Nespelem and Little Nespelem units is $1.25 per acre for the past two years.

3. DIGEST OF LEGISLATION, TREATIES, AND EXECUTIVE ORDERS

Act April 28, 1904 (33 Stat. 567): Authorized and directed to permit the Kellar and Indiana Consolidated Smelting Co., a corporation organized under the laws of the State of Washington, to construct a smelter in the immediate vicinity of the San Poil River, in the south half of the Colville Indian Reservation; that the smelter shall be located on the San Poil River, and that permission be granted to construct a flume from the site of the smelter to a point on the San Poil River, where a water supply can be made available; that 6 acres of land be set aside for the site of the smelter, and strip of land of sufficient width allowed for the erection and construction of the flume.

Act March 22, 1906 (34 Stat. 80): That the Secretary of the Interior be, and he is hereby, authorized, and directed, as hereinafter provided, to sell or dispose of unallotted lands in the diminished Colville Indian Reservation in the State of Washington.

SEC. 3. That upon the completion of said allotments to said Indians the residue or surplus lands, that is, lands not allotted or reserved for Indian school, agency, or other purposes, of the said diminished Colville Indian Reservation shall be classified under the direction of the Secretary of the Interior as irrigable lands, grazing lands, timber lands, mineral lands, or arid lands, and shall be appraised under their appropriate classes by legal subdivisions, with the exception of the lands classed as mineral lands, which need not be appraised, and which shall be disposed of under the general mining laws of the United States, and, upon completion of the classification and appraisement, such surplus lands shall be open to settlement and entry under the provisions of the homestead laws at not less than their appraised value in addition to the fees and commissions now prescribed by law for the disposition of lands of the value of $1.25 per acre by proclamation of the President, which proclamation shall prescribe the manner in which these lands shall be settled upon, occupied, and entered by persons entitled to make entry thereof.

SEC. 12. That if any of the lands of said diminished Colville Indian Reservation can be included in any feasible irrigation project under the reclamation act of June 17, 1902, the Secretary of the Interior is authorized to withhold said lands from disposition under this act and to dispose of them under the said reclamation act, and the charges provided for by said reclamation act shall be in addition to the appraised value of said lands fixed as hereinbefore provided and shall be paid in annual installments as required under the said reclamation act, and the amounts to be paid for the land, according to appraisement shall be credited to the fund herein established for the benefit of the Colville Indians.

Act May 18, 1916 (39 Stat. 155): That there is hereby appropriated, out of any funds in the Treasury not otherwise appropriated, $95,000, to be used by the Commissioner of Indian Affairs under the direction of the Secretary of the Interior, in the acquisition of water rights for lands heretofore allotted to Indians, situated within the boundaries of the West Okanogan Valley irrigation district, Okanogan County, Wash., and for the payment of the proportionate operation and maintenance charges of the said district. The Secretary of the Interior is authorized to negotiate for said water rights and to pay therefor as he may deem appropriate, such part of the sum herein appropriated as he may determine to be necessary for the best interest of the Indians: *Provided*, That nothing herein contained shall be construed to authorize any lien or claims upon or against said allotted lands not herein specifically appropriated for: *Provided further:* That the amount expended under this appropriation shall be reimbursed to the United States by the owners of the land on behalf of which such expenditure is made,

upon such terms as the secretary may prescribe, which shall be not less favorable to the Indians than the reimbursement required of settlers upon lands irrigated under the provisions of the reclamation act of June 17, 1902 (32d Stats. at L., p. 388), and acts amendatory thereof or supplementary thereto; and if any Indian shall sell his allotment or part thereof, or receive a patent in fee for the same, any amount of the charge made to secure reimbursement remaining unpaid at the time of such sale or issuance of patent shall be a lien on the land, and patents issued therefor shall recite the amount of such item.

Act June 30, 1919 (41 Stat. 3): General irrigation item. Provides $10,000 for irrigation work on the Colville Reservation, Wash. Reimbursable.

Act February 14, 1920 (41 Stat. 408): Under the general irrigation item $6,000 was appropriated for the construction, repair and maintenance of irrigation system on the Colville Reservation, Wash. Reimbursable.

Act March 3, 1921 (41 Stat. 1225): Authorized $6,000 for the construction, repair and maintenance of an irrigation system on the Colville Reservation. Reimbursable.

Act May 24, 1922 (42 Stat. 559–80): Appropriated $5,000 to be reimbursable for the construction, repair, and maintenance of an irrigation system on Colville Reservation.

Act January 24, 1923 (42 Stat. 1174): $6,000, reimbursable for the construction, repair, and maintenance of an irrigation system.

Act June 5, 1924 (43 Stat. 390): $6,000 to be reimbursable, for the construction, repair, and maintenance of an irrigation system on Colville Reservation.

Act March 3, 1925 (43 Stat. 1146): For the construction, repair, and maintenance of irrigation systems on the Colville Reservation, $5,000, reimbursable.

Act May 10, 1926 (44 Stat. 458): General irrigation item; provided $13,000, reimbursable, for the construction, repair and maintenance of irrigation systems on Colville Reservation.

Act January 12, 1927 (44 Stat. 934): General irrigation item; provided $6,000, reimbursable, for the construction, repair and maintenance of an irrigation system.

4. HISTORY

The Colville Reservation was established by the treaty of July 7, 1883, which was approved July 4, 1884, by Congress. When established the reservation covered an area of approximately 2,887,000 acres. The reservation was diminished to approximately half this size by the act of Congress approved March 22, 1906. The greater portion of the land remaining on the Colville Reservation is rough in character and covered with timber. The timber, however, is not as valuable as that on the western slope of the Cascade Mountains. The agricultural land consists of the flat lands lying along the various small streams on the reservation. The Columbia River runs on the south and east of the reservation, and the Okanogan forms the western boundary. These rivers run in comparatively deep canyons from which the land slopes in successive benches. The irrigable land lies at an elevation of approximately 2,000 feet.

The Indians of this reservation are the remnants of several bands, under the leadership of Chief Moses. These Indians had been accustomed to make their living practically entirely by fishing and hunting and lived a nomadic existence dependent on the supply of food. They knew practically nothing of agriculture at the time the reservation was established. In the first treaty with these Indians they ask that a sawmill and gristmill be provided and that farming implements be given them in order that they might make a living by agriculture.

The act of Congress of 1906 provided that water was to be reserved for the irrigation of irrigable lands on the reservation. Allotments were made to these Indians pursuant to the act of June 25, 1910. The irrigable allotments consisted of from 50 to 80 acres and practically all of the irrigable land on the reservation was allotted. The first irrigation construction work done for these Indians, excepting a small ditch built by the agency at Nespelem, was begun in 1915 and the Little Nespelem project completed the next year. The Indians have been taking but little interest in agricultural pursuits and less in farming irrigated lands. Owing to the distance from the railroad, which is some 45 miles from the Little Nespelem project, it has been impossible to lease any considerable amount of the land, and as a result but very little use is made of irrigation facilities. Reconnaissance surveys were made of the entire reservation to determine the possibilities of irrigation and the water power possibilities. These surveys were made during the year 1913. About the only unit on the reservation on which any considerable amount of work has been done is the Little Nespelem. About 1,000

acres of irrigable land are located on the San Poil River, to which a small ditch is being constructed, and water will be available in 1928 for this unit. Some aid has been given to the Indians living in the northeastern part of the reservation and they irrigate a small acreage from Twin Lakes.

5. LOCATION, TRANSPORTATION, AND MARKETS

State: Washington.
County: Okanogan and Ferry.
Longitude: 119°.
Latitude: 48°.
Railroads: Great Northern, west boundary and 20 miles east of reservation. Northern Pacific, 20 miles south.
Highways and roads: Sunset highway, 20 miles south; Caribou Trail along west boundary State road, Republic to Spokane through San Poil Valley.
Cities and towns: Nespelem, 200; Onak, 1,000; Keller, 100; Inchelium on reservation; Wilbur, 500; Almira, 400; and Republic near reservation.
Railway stations: Omak on reservation; Wilbur and Almira, 20 miles from reservation.
Markets: Local and Northwest.

6. RESERVATION LANDS AND ALLOTMENTS

(*a*) *Area, classification, and estimated value of individual Indian and tribal lands*

Classification	Acres	Value
Allotments	378,903	
Reserved for school, agency, etc	2,651	
Tribal grazing and timber	230,400	$6,700,000
Ceded for homesteads	1,450,702	
Unallotted and unreserved, mostly timber	824,373	
Original area of reservation	2,887,031	

(*b*) *Allotments.*—Moses agreement allotments made by Executive order May 1, 1886. Other allotments made between 1910 and 1916. All children living at that time were allotted. Allotment roll closed in 1916. All Indians were allotted on equal basis, 80 acres agricultural or 160 acres grazing. In Moses agreement, allotments were of several hundred acres; these allotments, however, are all located off the present reservation.
Three thousand one hundred and thirty-three allotments covering 378,903 acres of land have been made, of which 833 fee patents covering 85,471.97 acres have been granted.
One hundred and seventy-two allotments, totaling 19,768.1 acres of land, have been sold for $466,103.83, or $23.60 an acre.

7. POPULATION AND INDIAN HEALTH CONDITIONS

Indian population	2,917
Full bloods	1,365
Mixed bloods	1,552
Indian deaths (1926)	104
Indian births (1926)	130
Cases of tuberculosis	6
Cases of trachoma	13

8. CLIMATE

Range in elevation of irrigable land, 1,000 to 2,500.
Maximum temperature, 100; minimum temperature, 25°.
Average precipitation, 14 to 16 inches.
Average date last killing frost, May 15.
Average date first killing frost, October 1.
Average growing season, 160 days.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

Little Nespelem project—(*a*) *Topography.*—Topographic maps were made in 1913, by D. R. Rodman, with a 10-foot contour interval, with a scale of 1,000 feet to the inch. Flattest slope, 50 feet to the mile; steepest slope, 100 feet to the mile.

(*b*) *Soil.*—The soil in the upper part of this project has been described as generally a light clay. No soil survey has been made. Approximately 1,600 acres of allotted land within the project, alkalied at the time the project was built, might be reclaimed by drainage. Irrigation has not been extensive enough to determine whether or not other lands will be alkalied.

(*c*) *Irrigation methods and water delivery.*—The furrow system is used entirely. Practically continuous flow, excepting that water is turned off for harvesting crops and heavy rains.

(*d*) *Duty of water.*—Duty of water has been estimated for the crops grown at 2 acre-feet per acre plus 16 inches rainfall.

(*e*) *Principal crops and average crop production.*—Alfalfa and grain are the most important crops; 8 tons of alfalfa have been grown per acre; 5 tons will be nearer the average; 100 acres are in alfalfa and 40 acres in grain and garden. Estimated value, $50 per acre for alfalfa and $40 per acre for grain.

Nespelem project—(*a*) *Topography.*—Topographic map was made in 1913 by D. R. Rodman; scale, 1,000 feet to the inch and with 10-foot contour intervals. Average slope of irrigable area, 60 feet to the mile; 3,000 acres with 40 feet to the mile; 1,500 acres with 20 feet to the mile; 3,500 at 80 to 125 feet to the mile.

(*b*) *Soil.*—The soil in the north half of the project is made up largely of erosion from the surrounding hills, containing some sand and gravel covered with a sandy loam from a few inches to 2 feet in thickness.

The soil on the south half of the proposed project is a volcanic ash soil mixed with a fine sand and often underlaid with a light clay. All classes have been farmed in a small way from springs with a satisfactory result. Weeds and grasses grow in the early summer but after June there is little left but sagebrush. No analysis of soil has been made. To date alkali does not appear.

(*c*) *Irrigation methods and water delivery.*—Furrow system is practically continuous flow excepting that water is turned off for harvesting crops and heavy rains.

(*d*) *Duty of water.*—Duty of water including precipitation is estimated at 3 acre-feet.

(*e*) *Principal crops and average crop production.*—The crops grown on this project are practically the same as those grown on the Little Nespelem project.

10. WATER SUPPLY AND WATER RIGHTS

Nespelem project—(*a*) *Source.*—The source of water supply of the Nespelem project is from the Nespelem River. Practically all of the watershed of this river is in Indian ownership. The stream covers a watershed of approximately 122 square miles, ranging in elevation from 1,800 to 6,000 feet above sea level, with the average being approximately 3,500 feet. The rainfall varies from 14 inches on the lowlands to an estimated precipitation of 30 inches on the higher portions. The average annual run-off for the years reported was 29,112 acre-feet. Plans for the Nespelem project contemplate a storage reservoir that will hold approximately 10,000 acre-feet. By storing water in this reservoir and utilizing the natural flow of the stream, there is estimated to be an ample supply of water for 8,000 acres of land.

(*b*) *Project diversions.*—Two canals now divert water from the Nespelem River, one called the agency ditch and the other Nespelem ditch. All of the low-water flow is diverted through these canals. Beneficial use is being made of all the water diverted. No record has been kept of the amount of water so diverted.

Little Nespelem project—(*a*) *Source.*—The source of the water supply for the Little Nespelem project is the watershed of the Little Nespelem River. The Owhi Lake outlet was raised by placing a concrete dam across it and it was converted into a storage reservoir with a capacity of approximately 5,000 acre-feet. This stores the entire flow of the watershed above the reservoir. The average annual storage in this lake used in conjunction with the run-off below the lake furnishes between 3,000 and 3,500 acre-feet annually. This furnishes a sufficient amount of water for the 2,000 acres under the canal.

(*b*) *Project diversions.*—The water is diverted through a single canal from the dam across the outlet of Owhi Lake.

Miscellaneous projects.—The source of water supply for the San Poil project is the San Poil River. The natural flow in this stream is ample for the irrigation of the 1,000 acres which it is proposed to irrigate on this stream. This project will not be completed before the irrigation season of 1929.

The water supply for the Hall Creek project will be obtained from the natural flow of Hall Creek and storage in Twin Lakes. These two lakes will have a storage capacity of 900 acre-feet each, and this, together with the natural flow in Hall Creek will constitute the supply to irrigate 10,000 acres.

The Stranger Marsh and Barnaby Creek projects are in the same valley as the Hall Creek project and will derive their water from the same watershed.

The proposed Omak and Astor pumping plants will obtain their water supply from the Okanogan River, which is ample at all times.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

(*a*) *General plan.*—A general survey of irrigation and water power possibilities was made by the Irrigation Service in 1912, and the irrigable land was estimated at approximately 25,000 acres. Detailed investigations and plans were made of the Nespelem project in 1914. As contemplated at that time this project included what is now the Nespelem and Little Nespelem units. The original plan included a storage reservoir on Nespelem River with a capacity of 1,222 acre-feet and the conversion of Owhi Lake into a storage reservoir with a capacity of 5,000 acre-feet. This project contemplated construction of the storage dam on the Nespelem River and has never been started owing to lack of interest of the Indians in irrigation. However, two ditches have been constructed to divert the natural flow of this stream. Diversion is accomplished by means of a temporary diversion dam and approximately 1,500 acres are irrigable under these ditches, and all of the available water supply is used.

On the San Poil River there are approximately 1,000 acres susceptible of irrigation and for which there is an ample water supply. A temporary diversion dam and canals are being constructed and water will be available for irrigation on this unit during the fiscal year 1929. There are approximately 10,000 acres on Hall Creek, in the northwestern part of the reservation, which can be irrigated at an estimated cost of $20 per acre, and several small areas are located at widely scattered points.

(*b*) *Divisions or units of project*

Units	Estimated cost	Proposed irrigable	Present irrigable
Little Nespelem	$12.00	2,000	1,500.
Nespelem	30.00	10,000	1,500.
Hall Creek	20.00	10,000	None.
Barnaby Creek	10.00	800	Do.
Rogers Barr	[1] 61.83	[1] 850	Do.
Nine Mile	30.00	400	Do.
Wilmot Creek	70.00	1,440	Do.
San Poil	15.00	1,000	Not completed.
Astor Pumping	15.25	1,751	None.
	36.95	900	
Omak pumping	33.00	1,973	Do.

[1] If combined with Wilmot project.

(*c*) *Present condition of project.*—

Little Nespelem:

Ultimate irrigable area, 2,000 acres.
Area that can now be irrigated, 1,500 acres.
Area now actually irrigated, 140 acres.
Total construction cost to date, $21,335.86.
Acreage cost to date, $10.56 per acre.
Estimated when complete, $12 per acre.
Estimate to complete project, $2,000.
Most important structure remaining to be built, small flume, $200.

Nespelem:
Ultimate irrigable area, 10,000 acres.
Area that can now be irrigated, 1,500 acres.
Area now actually irrigated, 343 acres.
Total construction cost to date, $27,699.
Acreage cost to date, $2.75 per acre.
Estimate when complete, $30 per acre.
Estimate to complete project, $204,000.
Most important structure remaining to be built, storage dam.

(*d*) *Construction work yet to be done—principal features.*—The San Poil project was nearly completed last June, but lacks about $4,000 before water can be delivered. There are 1,000 acres of land; a small part of the lower end is still covered with timber. Fourteen allottees will come entirely or partly under this project. The water supply is sufficient and is obtained from the San Poil River with water for 160 acres coming out of Thirty Mile Creek through a 10-inch pipe line for some of the higher land. The land is all in Indian ownership excepting 10 to 15 acres of one corner of a homestead tract. Total cost to June 30, 1927, $9,544.49. Estimated acreage cost $14. Work was begun in the fall of 1926 and continued when weather would permit until funds were depleted in June.

Hall Creek project.—Only surveys and estimates have been made on this proposed project, which when completed will irrigate 10,000 acres of land on three branches along the Columbia River near the northeast corner of the Colville Reservation. The estimated cost of this unit at the time the survey was made was $17 per acre. If constructed during present prices it will cost approximately $23 to $25 per acre. Water supply will come from Hall Creek and from storage in Twin Lakes near the head of Stranger Creek. This storage is estimated to cost $1 per acre-foot. The water supply is said to be ample and the land is of excellent quality and estimated cost is reasonable.

Stranger Marsh, containing some 420 acres of land, is within the limits of the Hall Creek project, and was drained at a cost of $1,450.30 or considerably under the estimate of $5,200, largely due to a very favorable season for carrying on the work.

Barnaby Creek project, practically bounding the Hall Creek unit on the north, contains 800 acres and can be irrigated at a cost of about $10 per acre. Some of this land is covered with timber. Two allotments have passed into white ownership. The water supply will be derived from Barnaby Creek and is believed to be sufficient for the 800 acres of land.

Surveys have also been made for the following projects:

Wilmot Creek: Area, 1,440 acres; estimated cost, $70 per acre; water is to be diverted from Wilmot Creek; distribution system estimated at $7 per acre; storage, $63 per acre.

Nine Mile project.—Four hundred acres at an estimated cost of $40 per acre; 6,500 acre-feet can be stored at an estimated cost of $6.40 per acre-foot.

Rogers Bar.—Irrigable area 850 acres by pumping. By combining Wilmot and Rogers Bar the estimated acreage cost is $61.83.

Omak project (pumping).—Area, 1,973 acres, of which 1,124 acres can be reached with a 92-foot lift at an estimated cost of $38.98 per acre, and 849 acres with a 52-foot lift at an estimated cost of $23.62 per acre.

Some 700 acres of Indian land can also be reached with a 142-foot lift at an estimated cost of $47.31; 243 acres with a 71-foot lift at a cost of $20 per acre, and 286 acres with a 138-foot lift at a cost of $62.77 per acre. These are all practically Indian lands and the water supply will be derived from the Okanogan River.

The operation and maintenance on all of the above would be much higher than for gravity projects.

Astor pumping project.—A total area of 2,651 acres can be irrigated at an estimated cost of $20.82 per acre, with an annual operation and maintenance cost of $4.65 per acre. By irrigating only the 1,751 acres, that none of the allottees object to, the construction cost would be $15.25. The other 900 acres separately would cost $36.96 per acre.

Many other surveys were made, but projects were not deemed feasible. There were two reasons for making the surveys, one to determine the feasible projects before the reservation was opened and one to be in shape to perfect water right by construction proof and beneficial use.

The former north half of the Colville Reservation is a good example where there was no protection of the waters. Here the white homesteaders have taken the water, to the detriment of the Indian, as the homesteaders are more enterprising.

The total expenditures to date for irrigation construction and operation and maintenance for the benefit of land owned by the Colville Indians has been $216,179.74. Of this amount $165,342.49 was expended on surveys, investigations, and construction. The construction costs on the Nespelem were $27,199.37; Little Nespelem $20,177.33; San Poil $9,627.53; West Okanogan $95,000; and of the various small units $12,421.03, and inventory on hand $917.23. The total expenditures on operation and maintenance amounted to $50,837.25, of which the costs on the Little Nespelem have amounted to $21,323.56; Nespelem, $22,330.88; and the West Okanogan $11,876.12, and miscellaneous projects $3,806.69

12. SUMMARY OF PROJECT WORKS

Nespelem.—The agency ditch was constructed first largely to supply water to the new agency and school farms and those allottees coming under it. This was the first ditch constructed and was enlarged later.

The Nespelem Canal, as heretofore stated, was constructed largely to irrigate the flat west of Nespelem and at the same time make use of the low water flow and thereby protect the stream for the Indians against proposed mining development below.

The Nespelem Canal diverts water from the Nespelem River 1 mile above the town of Nespelem through a timber head gate connected with a timber diversion dam. The ditch for about a half a mile is on a steep sidehill. It has a capacity of 12 second-feet and is 3½ miles in length, supplying water to 5 miles of small laterals. The agency ditch diverts at present from the old mill pond on Nespelem River practically in the town of Nespelem, running south a distance of nearly 3 miles, supplying water to 2 or 3 miles of small laterals. The two ditches and all laterals aggregate 10 miles.

All structures are small and constructed of wood, being 40 in number. There are fourteen 10-foot bridges and one wooden flume 3 by 5 feet, 150 feet in length; 18,000 cubic yards of class 1 material was excavated at a cost of $4,600.

Approximately $6,500 of the cost of the original surveys has been charged to this unit.

The diversion dam is 30 feet long with five gates or grooves for flashboards 5 feet in length, which are removed in winter. It is necessary to raise the water only 3 feet. There are 6,000 board-feet of lumber in the dam and head gates, placed at an estimated cost of $50 per thousand, or a total cost of $300.

Canal structures and excavation

	Lumber	Approximate cost
Diversion dam and head gate	5,000 feet board measure	$250
Excavation	500 yards	400
150-foot flume	2,000	100
40 head gates, at $7 each		280
Canal excavation	18,000 cubic yards	4,600
Bridges	7,000 feet board measure	280

There are no drainage canals on the reservation.

Little Nespelem.—Owhi Dam: This is located at Owhi Lake near the head waters of the Little Nespelem Creek. The lake covers an area of 500 acres and can now store a depth of 10 feet or 5,000 acre-feet.

The dam consists of a 24-foot concrete spillway, 3 gates, 2 each 4.5 in width, constructed at the time the dam was built, and 1 3 by 3 feet, constructed so as to draw lake lower. The balance of the dam is an earth dike with concrete core wall resting on timber-sheet piling.

13. Area and utilization of irrigable lands, 1927

	Little Nespelem	Nespelem	Entire reservation
Acreage arable	2,000	10,000	12,000
Acreage arable owned by Indians	2,000	7,887	9,887
Acreage arable owned by whites		80	80
Acreage irrigable	1,500	1,500	3,000
Acreage irrigable owned by Indians	1,500	1,398	2,898
Acreage irrigable owned by whites		80	80
Acreage irrigated	140	343	483
Acreage irrigated by Indians	51	165	216
Acreage irrigated by lessees	89	149	238
Acreage irrigated by white owners		29	29
Indians farming	8	18	16
Lessees farming	3	5	8
White owners farming		4	4

14. Principal crops, crop yields, and returns (entire project)

	1926	Value	1927	Value
	Acres		*Acres*	
Alfalfa	151	$7,200	257	$10,280
Alfalfa seed			7	350
Apples	1	50	1.5	100
Barley	155	5,000		
Beans	.50	50	.5	50
Beets, sugar			.5	25
Corn	17.50	520	8	240
Corn fodder			14	350
Garden	26	1,500	40.5	2,025
Other hay			5	150
Oats	25	750	440	1,200
Onions	1.25	100	1	80
Pasture	5	100		
Peas	.25	30		
Peaches			.5	30
Potatoes	4	300	7	700
Wheat	25	1,250	66	2,500
Total	414.50	16,850	483	18,080
Average per acre		40		37

15. ECONOMIC CONDITIONS AMONG PROJECT FARMERS

Little Nespelem.—Number of Indians farming, 8. The Indians practicing irrigation farming under this project have the following livestock:

56 horses, valued at	$1,550
15 cattle (beef), valued at	700
25 fowls, valued at	25
3 hives of bees, valued at	30
Total value	2,305

Average crop value per acre irrigated crop, $44.
Average acreage irrigated per family, 8½ acres.
Acres leased by whites, 89, at $50 per acre.

Very few Indians have paid operation and maintenance. No land is in white ownership. The superintendent of the reservation makes collections, and no water is supposed to be delivered until payments are made. This, however, has not been the case.

Collections for Little Nespelem: Indians, $30; leased, $407.75; total, $437.75.

Nespelem:

Estimated value of livestock per farm	$650
Estimated value of equipment per farm	$203
Acreage farmed by Indians	166
Average acreage farmed per family	8½
Average crop value per family	$340
Average crop value per acre	$40
Indian irrigable land sold at	per acre
Average sale price per acre (irrigable)	$80
	$20

No construction assessment made; project incomplete.

Grain is the only cash crop raised on this project and costs the farmers from $15 to $20 per ton to freight to railroad 40 miles away.

16. PROJECT OPERATION AND MAINTENANCE—ORGANIZATION

One assistant supervisor of ditches is employed to look after all the work on the Colville Reservation, at $1,860 per year, less $240 for quarters, fuel, and light. Day labor is also employed when necessary. Two or three months of the time of the assistant supervisor is not charged to the project, as he has work on other projects.

17. CONSTRUCTION AND OPERATION—MAINTENANCE COSTS AND COLLECTIONS

(a) Construction cost to June 30, 1927

Nespelem unit	$14,022.04
Little Nespelem	20,177.33
West Okanogan	95,000.00
San Poil	9,627.53
Miscellaneous	25,598.36
Total construction costs	164,425.26
Inventory on hand from reimbursable appropriations	917.23
Total expenditures for construction work	165,342.49

(b) Collection of construction cost

No construction assessments have been made on any of these units except the West Okanogan. The collections on this unit are handled by the reservation superintendent, and $3,989.16 has been collected as partial repayment of the $95,000 expended.

(c) Operation and maintenance costs to June 30, 1927

Reimbursable moneys expended	$50,452.37
Collections made and expended	384.88
Total expenditures	50,837.25
Operation and maintenance costs:	
Nespelem unit	22,330.88
Little Nespelem	12,323.56
West Okanogan	11,876.12
Miscellaneous	3,806.69
Total costs	50,837.25

Operation and maintenance assessments are being made by authority of the Secretary of the Interior only on the Little Nespelem and Nespelem units, at the rate of $1.25 per acre per year against all Indian land.

Total assessments made to June 30, 1927		$2,196.79
Collections:		
From Indians	$48.02	
From white owners and lessees	826.50	
		874.52
Delinquent assessments		1,322.27

(d) Operation and maintenance collections to June 30, 1927.—The area now possible to irrigate, approximately 3,500 acres, is used as the basis for computing the per acre operation and maintenance assessment. Assessments are made annually and collections are due on or before delivery of water. Collections are supposed to be enforced by nondelivery of water, but this ruling is not enforced on the Indians. Collections are made from lessees and owners, both white and Indian. Estimates are made from past experience and taking into consideration necessary repairs, which method is the best that can be used under present con-

ditions. With more land leased under improvement leases, it would soon be brought under irrigation and better farming instructions for Indians would soon make the project self-supporting.

	1924	1925	1926
Per-acre operation and maintenance assessments:			
On Indian land not leased	1.00	1.25	1.25
On leased Indian land	1.00	1.25	1.25
On white-owned land	1.00	1.25	1.25
Operation and maintenance collections on Indian land not leased			23.75
On leased Indian land	157.00	191.25	142.50
On white-owned land	3.50	14.61	16.25
Operation and maintenance delinquencies on Indian farmed land	70.00	89.38	110.00
On Indian leased land	1.00		43.75
On white owned land	None.	None.	None.

18. GENERAL DISCUSSION OF PROJECT PROBLEM

The Colville project consists of several small units on the Colville Reservation. This reservation is situated in the northern part of Washington to the north and west of the Columbia River and east of the Okanogan River.

Thus far expenditures have been made largely on the Nespelem and Little Nespelem units. These two units may be considered as one in this general discussion instead of being treated under different heads. The irrigable area of these units lies along and adjacent to the streams by the same names and near the Columbia River, but at a considerable elevation above the river level.

The water is supplied from short streams which have their source in the elevated area around Moses Mountain about 18 miles north of the Columbia River. It is claimed that a project of 12,000 acres can be developed on these streams. One natural lake (Owhi) has already been developed to a capacity of 5,000 acre-feet near the headwaters of the Little Nespelem. It is proposed to construct a reservoir of about 10,000 acre feet capacity on the Nespelem River. Some small canals have been built in addition to the development of Owhi Lake, which will now serve 1,500 acres, all of which, with the exception of 100 acres, is in Indian ownership. During the past six years an average of 518 acres per year have been farmed.

Expenditures also have been made upon several other small units which are carried as miscellaneous projects with the Nespelem. Without attempting to separate them the following are the amounts expended to date on the Nespelem and Little Nespelem:

Construction cost to June 30, 1927	$59,808.23
Operation and maintenance to June 30, 1927	38,961.13
Total cost to June 30, 1927	98,769.36
Collections (construction and operation and maintenance)	887.02
Net investment	97,882.34

The operation and maintenance cost for 1927 was $3,630.51, or $7.50 per acre for the acreage cultivated.

The cultivated acreage for the past six years has shown a considerable decrease, and while it is possible that a few more acres may be farmed by the Indians, as was pointed out in the hearing before the Appropriation Committee on the 1926 appropriation bill, we find that in 1927 only 216 acres were farmed by Indians.

It may be contended, because the water supply is short after the middle of June on the Nespelem, that the reclaiming of more land is retarded. As grain and hay are the main crops grown and with a storage capacity of 5,000 acre-feet in Owhi Lake, the conclusion is drawn that there is no pressing demand for irrigation by the Indians in this section.

Opportunities for development.—The San Poil unit constitutes a small area of about 1,000 acres along and parallel with the river by that name. This tract lies 12 to 15 miles east of Nespelem and 20 miles north of the Columbia River. The San Poil River is the largest stream in the reservation and has a better water supply than the other streams.

A total of $9,617.03 was expended on this unit to June 30, 1927. It was claimed by the project management that it would require an expenditure of about $4,000 additional in order to complete this unit to where water could be delivered to any portion of the land. When your advisors visited the project in June, 1927, it was still in an uncompleted state.

In the hearings before the Appropriation Committee for the 1929 appropriation the following statement is made: "The San Poil unit, Colville Reservation, was constructed during the fiscal year 1927 at a cost of $9,617.03. An additional 500 acres of land were made available by that construction. It will require $3,000 in pipe lines, etc., to be placed. These 1,017 acres would come under the ditches, June 30, 1927 was the last day work was done on this unit."

The Hall Creek unit is in the extreme eastern part of the reservation near the Columbia River, but considerably above it in elevation. It is claimed this unit contains 10,000 acres and will receive its water supply from Hall and other small creeks. No construction has as yet been done.

Barnaby Creek unit is in the extreme northeastern corner of the project, containing about 800 acres which would receive its water supply from Barnaby Creek. No work has been undertaken.

Wilmot Creek unit is in the eastern part of the reservation some 12 or 15 miles south of the Hall Creek unit. It is estimated to contain 1,440 acres receiving its water supply from Wilmot Creek. No work has been done.

Nine Mile unit is a few miles south of Wilmot unit. It consists of about 400 acres, which would be supplied from Nine Mile Creek. No construction work has been done.

Rogers Bar unit consists of several isolated tracts in the vicinity of the Wilmot unit. It is estimated there are 850 acres in this unit and the water would be supplied by pumping from the Columbia River. No construction work has been done.

The Omak pumping unit, consisting of about 2,000 acres, is composed of a number of pumping lifts from the Okanogan River in the vicinity of Omak. Up to the present time no construction work has been done, but the construction and upkeep of this unit would naturally be high and would of necessity require development as a fruit section to justify the expenditure. However, fruit culture does not fit in with the Indian's limited agricultural knowledge.

The Astor pumping unit would be a similar proposition to the one described above. It is located near the mouth of the Okanogan River and covers a little over 2,600 acres. No construction work has been done.

The last-named units, Omak pumping and Astor pumping, are situated within reasonable railroad transportation distance, and were these lands in white ownership, they would probably be developed for fruit tracts.

General economic conditions.—The areas that may be reclaimed on this reservation are contained in numerous small tracts widely scattered over the reservation, as shown above. They are isolated one from the other with poor roads connecting with the outside world. There are no railroads on the reservation and Nespelem is 35 to 40 miles from the nearest railroad point. The Columbia River furnishes the only means of shipping any produce out at the present time, and there is no regularly established transportation service on it. As far as can be seen at the present, this section offers no inducement for better transportation facilities. Should a project of 12,000 acres develop, it would undoubtedly get improved roads, but there would still be no inducement for better railroad transportation. The fruit and agricultural sections of Okanogan and Wenatche and even Yakima offers employment to the Indians who want work. The grain regions to the east and southeast also give some opportunity for employment.

In 1922 the supervising engineer stated in his annual report: "They (the Indians) will not stay at home long enough to properly look after their crops. First, there is the Salmon run on the San Poil River and all the Indians attend about two weeks. This usually occurs in May. Then there is the Fourth of July celebration; then huckleberries and the various fairs in the vicinity; then hop picking and the deer season. These all tend to interfere with farming operations."

With the possibility of the Indian getting a portion of his living by fishing in the adjoining small streams and the Columbia River and the opportunity of other employment within a reasonable distance and the general surrounding conditions, it must be anticipated that the Indian farming on their reservation will not develop to any great extent. The district is too isolated to be attractive to white

settlers. Stock or sheep raising probably offers the best opportunity of reclaiming these lands, but at the present time there seems to be very little demand for development along this line. Dry farming is practiced to some extent, and it is questionable as to the extent of this development in the future, due largely to transportation conditions.

West Okanogan irrigation district, as this tract is called, consists of 140 acres of land in the extreme northern part of Washington along the Okanogan River. These lands are within the West Okanogan irrigation district, which was a part of the ceded reservation. The land was originally Indian allotments for which a water right was purchased from the irrigation district. This was authorized by the act of May 18, 1916 (39 Stat. 155) as follows:

"That there is hereby appropriated out of any funds in the Treasury not otherwise appropriated, $95 000, to be used by the Commissioner of Indian Affairs under the direction of the Secretary of the Interior in the acquisition of water rights for lands heretofore allotted to Indians situated within the boundary of the West Okanogan Valley Irrigation District, Okanogan County, Washington, and for the payment of the proportionate operation and maintenance charges of the said district. The Secretary of the Interior is authorized to negotiate for said water rights and to pay therefor as he may deem appropriate such part of the sum herein appropriated as he may determine to be necessary for the best interests of the Indians: *Provided*, That nothing herein contained shall be construed to authorize any lien or claims upon or against said allotted lands not herein specifically appropriated for: *Provided, further*, That the amounts expended under this appropriation shall be reimbursed to the United States by the owners of the land on behalf of which such expenditure is made, upon such terms as the Secretary may prescribe which shall not be less favorable to the Indians than the reimbursement required of settlers upon lands irrigated under the provisions of the Reclamation Act of June 17, 1902 (32 Stat. 388), and acts amendatory thereof or supplementary thereto; and if any Indian shall sell his allotment or part thereof, or receive a patent in fee for the same, any amount of the charge made to secure reimbursement remaining unpaid at the time of such sale or issuance of patent shall be a lien on the land, and patents issued therefor shall recite the amount of such item."

Under this appropriation the entire $95,000 was expended for the purchase of a water right, and later the appropriation act of May 24, 1922, carried an item of $20,000 to pay for the operation and maintenance, which was to be reimbursable in accordance with the provisions of the act of May 18, 1916. From this, $11,876.12 was paid on operation and maintenance by the Government, making a total investment of $106,876.12 by the Government, of which $3,989.16 has been repaid.

A larger part of these lands passed to private ownership, and on February 19, 1918, the Secretary of the Interior issued instructions that lands sold by Indians should reimburse the Government in 20 annual instalments to commence within two years of date of sale. Payments were to become due and payable December 1 of the second year following purchase.

The records and correspondence show that about 1,000 acres of the original amount of 1,401 acres have passed to white ownership, and a part of the acquired acreage has been subdivided into 5 and 10 acre tracts and even less.

There has been considerable correspondence between the bureau and the superintendent of the agency about the collection of the overdue instalments from the present owners and allottees. There is approximately $19,100 accrued on the original construction, of which $3,989.16 has been collected, leaving $15,110.84 past due, and in addition thereto is the operation and maintenance advanced by the Government that is reimbursable. The Government has been requested to extend the time of meeting these payments. The secretary of the irrigation district, in a letter dated April 20, 1927, states to Superintendent Meyer: "To date there has been no part of the initial cost, covered by outstanding lands, paid by any one, nor will there be any redemption of bonds until 1933. Why should the Government demands, for the repayment of the principal cost, be more stringent than ours? We quite agree that the matter should be definitely settled, but it is our belief that the white purchaser of Indian land should have the repayment period extended to conform with the district terms."

It would appear that this is an appeal without any just foundation. It can hardly be assumed that the district has outstanding bonds for the construction without paying the interest on the same, probably in the neighborhood of 6 per cent, which must be met annually, besides the principal when it becomes due.

The Government charges no interest, and the terms of payment on the principal based on 20 annual instalments is only 5 per cent, which is less than the interest to be met by those who have the bonded indebtedness to meet. The Government's terms are much easier than the district terms, and the present owners should be required to pay promptly.

Attempts have been made by the bureau to have these collections made by Superintendent Harvey K. Meyer and his predecessor, but little or no progress has been made. Letters addressed to the superintendent from the Washington Office upon the subject, dated May 6, July 30, and October 4, 1927, have been ignored and remain unanswered.

We can not escape the conclusion that the dilatory methods used in making the collections from the white purchasers of these Indian lands is inexcusable and unbusinesslike. There is no reason why these collections should not have been made when due.

There seems to have arisen some questions as to the irrigable acreage on tracts where subdivision has taken place and different portions of the original allotment passed to different owners that will probably require the services of the engineering branch. The area in question is outside the reservation, and as the payments for the purchase of land have been made, there only remains the collection for the construction charges. Now that the Indians' interests have been extinguished, the superintendent of the agency is very little interested in the collection of the remaining charges for construction.

In view of the above facts the matter should be taken out of the hands of the superintendent and placed in the hands of the supervising engineer of that district with instructions to collect the amounts, or, if impossible to collect, to recommend that suit be brought against the parties that are now delinquent, and that this matter be followed up promptly by the bureau.

It is noted in the correspondence that trouble has arisen in a number of instances where the purchaser of the Indian irrigated lands has not been definitely informed as to all the charges due the Government in the advertisement for sale or in the contract of purchase. The case of the purchase of the Whitestone Land Settlement Agency is one of this kind. There seems to be a lack of cooperation between those handling sales and leases and those handling irrigation charges in that advertisements for the sale of lands are put out without including all irrigation items or leases are made without a full knowledge of the facts pertaining to irrigation conditions. If these matters are to be handled by different branches, no notice of sale or leasing, a sale contract or lease should be made without the approval of someone in charge of the irrigation branch in order that all irrigation charges may be included or the sale or lease made to conform to irrigation conditions.

From a general study of the records of the irrigation branch of the Indian Office, there is apparently a woeful lack of cooperation of the branches handling different parts of the work, which is illustrated by the way the affairs of the West Okanogan irrigation district have been transacted.

Irrigation on Crow Reservation, Mont.

1. RECOMMENDATIONS

It is recommended:

1. That there be made an accurate determination of the irrigable productive acreage of the project, based on a thorough study as to the adequacy of the water supply and on a soil survey and classification; that the lands to be included in the project be selected, and that the project boundaries be fixed.

2. That, until the productive irrigable area for which there is an adequate water supply is determined and the limits of the project fixed, there be no further construction, extensions, enlargements, or permanent improvements.

3. That, because of the excessive cost of the concrete structures on this project and the unsatisfactory material for concrete at some places, consideration be given to the use of wood instead of concrete in the replacement of structures in the future.

4. That hereafter, if concrete structures are built, they be built in accordance with simple and approved designs as universally used in irrigation work, rather than the complicated and excessively expensive types that have been used in the past.

5. That, before making structure replacements in the future, consideration be given to eliminating some of the numerous unnecessary structures by adapting the work to local conditions.

6. That, in the interest of economy, ditchriders should be employed during the irrigation season only.

7. That as the salaries for regular employees on this project aggregate $22,000 annually, which is $2.60 per acre for the area irrigated during 1927, some effort be made to reduce this item of cost.

8. That the practice heretofore in vogue on this project of making extensions to canals and bringing additional areas under constructed works, while at the same time admitting the adequacy of the water supply is questionable, and also admitting that so far as known there are no storage sites, is deserving of censure.

9. That as less than one-half of the land now provided with irrigation facilities is being utilized, efforts be made to increase the area utilized by leasing and otherwise, if for no other reason than the protection of the water right, and the payment of operation and maintenance charges.

2. SYNOPSIS

The Crow Indian Reservation was established by act of Congress of July 25, 1868, ratifying a treaty made with the Crow Tribe on May 7, 1868.

This reservation is in southeastern Montana. It is approximately rectangular in shape, being about 80 miles in length from east to west with a maximum width of about 53 miles. The area is practically 2,256,463 acres. As originally established the reservation was about four times its present size, but has been reduced to its present limits by the agreements of 1880, 1890, and 1904.

Transportation and markets.—The Chicago, Burlington & Quincy or Burlington Railway traverses the reservation via the valley of the Little Big Horn River, and the towns of Hardin (population 1,000); Lodge Grass, Wyola, and Crow Agency are on the railroad. The prosperous city of Billings (population 20,000), just northwest of the reservation, is on the Burlington and Northern Pacific Railroads. Sheridan, Wyo. (population 15,000), is a short distance south of the reservation. Unfortunately the Big Horn Valley, in which is the largest and most desirable part of the irrigable area, has no railroad. The southern end of this valley is about 30 miles from the railroad.

Allotments.—Allotments aggregating approximately 600 acres each were made to all Indians living between 1890 and 1920. All irrigable, dry-farm, and grazing land was allotted in the ratio of 1, 2, and 4. Irrigable allotments average about 40 acres each. About 2,000,000 acres have been allotted, of which approximately 1,500,000 acres are held by trust patents. It is reported that 302 irrigable allotments, about 12,000 acres, have been sold at an average price of about $8 per acre, with no provision for requiring the purchasers to pay the irrigation construction cost.

Population and Indian health.—The population in 1927 is given as 1,854, being a gain of 135 since 1920. There are 1,069 full bloods. It is reported there are 444 cases of trachoma, and out of 450 examined 56 have tuberculosis. No Indians are receiving rations.

Climate.—Range in altitude, 2,500 to 3,500. Range in temperature, 46° below zero to 107°. The average date of last killing frost in spring is May 15 and of first killing frost in autumn, September 26. Average length of growing season, 144 days.

Topography.—There has been no topographic survey of the irrigable area. The cost of preparing land for irrigation (clearing, plowing, leveling, and ditching) ranges from $10 an acre for the smoothest to $50 an acre for the roughest and about $15 an acre for the average.

Soil and drainage conditions.—There has been no soil survey of the irrigable area. The soil in general is a clay loam, 3 to 10 feet deep and in some localities is very heavy. The native vegetation is blue-joint grass. A few small scattered areas, reported as aggregating about 1,100 acres, are nonproductive as the result of seepage and alkali. No drainage has been provided. It is the opinion of the advisers that an extensive drainage system will be required, particularly in the Big Horn Valley.

Water supply and water rights.—There are no storage reservoirs on this project. All water is supplied by direct diversion from streams within the reservation. From the records made available for our use we seriously question the adequacy of the water supply for all units of this project other than the Big Horn, if and

when all the irrigable land is brought into cultivation. In consequence the advisers are of the opinion that no further extensions to these units should be made pending a thorough investigation and study of the water supply.

It is reported that all appropriations of water are properly filed as required by Montana laws. There has been no adjudication of the waters of any of the streams of the reservation.

General plan of irrigation development.—The irrigation development, aside from that in the Big Horn Valley, consists of small units, scattered over a large area. The project includes 13 units as follows: The Pryor Creek, Lost Creek, and Coburn units on Pryor Creek, in the western part of the reservation; the Big Horn, Two Leggins, and Soap Creek units on the Big Horn River near the center of the reservation and the agency, Reno, Lodge Grass, Forty Mile, Bozeman Trail, and Upper Little Horn units, along the Little Big Horn River in the eastern part of the reservation. The Two Leggins and Bozeman Trail Canals, however, while always included in the reports on this project, were constructed not by the Government, but by canal corporations and the Government purchased carriage rights for Indian land served by them.

Summary of project works.—There are 321 miles of canals and laterals, 601 concrete, 2,068 wood, 48 metal, and 2 masonry canal structures, including 5,428 feet of steel flume and 1,580 feet of wood flume; also 19 residences, 1 office, 6 barns, and 8 warehouses. Project telephone lines aggregate 41 miles, with 20 stations.

Utilization of land.—The acreage ultimately irrigable, if and when the project is completed as now contemplated, is given as 62,229. It is reported that it is now possible to irrigate from the distributary system as at present constructed 56,163 acres. Here, as on nearly all Indian reservation projects, the advisers are of the opinion that both of the above areas will be materially reduced if and when irrigable area and soil surveys are made.

The total area irrigated during the season of 1927 was only 8,369 acres; but the total area cropped or cultivated is reported as 23,887 acres; the difference between the cultivated and irrigated areas, 15,518 acres, being land within the project that was not irrigated, but dry farmed, the season of 1927 having been favorable for dry farming.

Of the 8,369 acres irrigated in 1927, 535 acres were irrigated by Indians, 4,674 acres by lessees, and 3,160 acres by white landowners.

Of the 15,518 acres of project land that were dry farmed in 1927, 3,669 acres were dry farmed by Indians, 9,633 acres by lessees, and 2,216 acres by white landowners.

Crop yields and returns.—Unfortunately, in making the crop survey and estimate, the irrigated land and the dry-farmed land were not segregated, so that we have no record for a comparison of the crop yields secured under the two systems of farming, irrigated and dry farmed. Some experienced and well-informed farmers stated that in favorable seasons, dry-farm crops are as good as irrigated crops, while others stated they would average about $3 less per acre.

During 1927, 150 Indians farming 4,204 acres (535 acres irrigated and 3,669 acres dry farmed) grew crops estimated at $50,905, the average return being $12 per acre. The Indians farmed an average of 28 acres each and the average crop return for each of the 150 Indian families engaged was $339. It is interesting to note that for the seasons of 1925 and 1926, when all farming was under irrigation, the average acre-crop returns secured by Indians were $10 and $9, respectively. The three principal crops grown by Indians in 1927 were alfalfa, 1,368 acres, with an average value of $10 per acre; 1,313 acres of wheat, average return, $17 per acre; and 929 acres of wild hay, average return, $4.81 per acre.

One hundred and fifty lessees farming in 14,307 acres (of which 4,674 acres were irrigated) produced crops estimated at $299,968 or approximately $21 per acre. Lessees grew 661 acres of sugar beets with an estimated return of a little over $100 per acre, which is an indication of the possibilities of this project for good farmers.

Project operation and maintenance organization.—There is 1 engineer, salary $3,100; 1 clerk, at $1,860; and 9 ditch riders, at $1,440 each per annum, with quarters, fuel, light, etc., supplied for all employees. Ditch riders are employed throughout the year, though the irrigation season is only 144 days and the advisers join the Indians and white water users in wondering what they do in the winter. The salaries and perquisites for regular employees aggregate $22,000 annually, or about $2.60 per acre for the acreage irrigated in 1927.

Construction cost.—The total construction cost to June 30, 1927, is $1,978,934.99. The total expenditure for construction is given as $2,016,865.77.

This is diminished by a material and equipment inventory of $37,930.78 to arrive at the construction cost as reported.

The average per acre construction cost to date, pro-rating the total cost to the 56,163 acres reported as now irrigable from the irrigation system as constructed, is given as $31 per acre; varying on the different units from $11.62 per acre for the Pryor Creek unit to $41.72 per acre for the Big Horn unit.

Collection of construction cost.—Irrigation activities on the Crow Reservation had their inception under the act of March 3, 1891 (26 Stat. 1040), appropriating for construction $200,000 from the tribal fund. Subsequent legislation appropriated various amounts from the Crow tribal funds, without any provision for reimbursement until in the act of May 25, 1918 (40 Stat. 754), authorizing the expenditure of $200,000, it is provided said sum shall "be reimbursed to the tribe." Legislation following this for some years had the same reimbursable provision until in the act of June 4, 1920 (41 Stat. 571), it is provided "all expenditures for irrigation works on Crow Reservation heretofore or hereafter made are hereby declared to be reimbursable * * *" and "shall constitute a lien against the land benefitted regardless of ownership and including all lands that have heretofore been sold or patented."

All moneys expended for irrigation, both construction and operation and maintenance, on the Crow Reservation prior to June 30, 1923, were from the tribal fund. The appropriation for the fiscal year 1924 was from the United States Treasury.

By the terms of the act of May 26, 1926, amending the act of June 4, 1920, only those expenditures on the Crow irrigation project are reimbursable which were made from tribal funds and were not specifically approved by the Indians in council, or which were funds other than gratuities, out of appropriations from the United States Treasury.

A determination of the amount reimbursable under the provisions of the act of May 26, 1926, is now being made by the Bureau of Indian Affairs. We are advised that this work, so far as it has progressed, indicates that of the total construction cost to June 30, 1927, $1,978,934.99, about $235,000, is reimbursable. The total construction cost collections to date are given as $4,789.46.

Operation and maintenance cost and collections.—The operation and maintenance cost to June 30, 1927, was $1,011,284.58, of which $839,819.19 is from appropriations of tribal funds and $171,465.39 are collections that have been expended. The average operation and maintenance cost to date is $18 per acre.

Operation and maintenance collections on acreage irrigable

	1924	1925	1926
Assessment rate per acre	$1.50	$1.40	$1.00
Total assessment	79,527.95	71,194.81	81,123.00
On Indian land not leased	49,193.85	46,069.56	33,923.24
On Indian land leased	13,936.74	11,894.62	29,264.35
On white-owned land	16,397.36	16,230.63	17,664.91
Total collections	23,606.51	19,243.43	14,932.34
On Indian land not leased	572.82	2,279.78	287.50
On Indian land leased	12,372.52	7,056.12	6,341.79
On white-owned land	10,661.17	9,907.53	8,303.05
Total delinquencies	55,921.44	54,951.38	66,190.66
On Indian land not leased	48,621.03	43,789.78	33,636.24
On Indian land leased	1,564.22	4,838.50	22,922.56
On white-owned land	5,736.19	6,323.10	9,631.86

The operation and maintenance collections to date are $249,241.12, leaving an operation and maintenance deficit of $762,043.46. Assuming that $285,782.78 now delinquent on Indian-owned land may eventually be collected, it is probable that about $478,260.68 of the operation and maintenance expenditures are uncollectible.

Total investment and probable returns

Total construction cost to June 30, 1927	$1,978,934.99
Total operation and maintenance cost to June 30, 1927	1,011,284.58
Total cost, construction and operation and maintenance	2,990,219.57

Less construction collections	$4,789.46	
Less operation and maintenance collections	249,241.12	
Total collections		$254,030.58
Present net investment		2,736,188.99

Probable returns

Estimated future collections on construction	$235,000.00	
Estimated future collections, operation and maintenance	283,782.78	
Total estimated returns		518,782.78
Probable loss on investment		2,217,406.21

3. DIGEST OF TREATIES, EXECUTIVE ORDERS AND LEGISLATION

Laws.—Crow agreement, March 3, 1891 (26 Stat. 1040): That, in consideration of the cession of territory herein made by us as individual Indians and heads of families of the Crow Tribe to the Government of the United States, the said Government of the United States, in addition to the annuities and sums for provisions and clothing stipulated and provided for in existing treaties and laws, hereby agrees to pay the sum of $946,000, lawful money of the United States, in the manner hereinafter described:

First. That of the above-named sum there is hereby appropriated and set apart $200,000 to be expended under the direction of the Secretary of the Interior in the building of dams, canals, ditches, and laterals for the purpose of irrigation in the valleys of the Big Horn and Little Big Horn Rivers, and on Pryor Creek, and such other streams as the Secretary of the Interior may deem proper: *Provided*, That not to exceed $50,000 shall be expended annually in performing this work: *And provided further*, That the superintendent in charge of said works shall, in the employment of laborers, be required to give preference to such Indians of the Crow Tribe as are competent and willing to work at the average wages paid to common laborers for the same kind of work, and the labor so employed shall be paid in cash.

That the sum of $75,000 is hereby appropriated and set apart as an irrigating fund, to be expended under the direction of the Secretary of the Interior for the maintenance and management of the system of irrigation provided for in this agreement.

Act of March 1, 1899 (30 Stat. 947).—* * * *Provided*, That, with the consent of the Crow Indians in Montana, to be obtained in the usual way, the Secretary of the Interior, in his discretion, may use the annuity money due, or to become due, the said Indians to complete the irrigation system heretofore commenced on said Crow Indian Reservation.

Act of May 31, 1900 (31 Stat. 247).—* * * *Provided*, That with the consent of the Crow Indians in Montana, to be obtained in the usual way, the Secretary of the Interior, in his discretion, may use the annuity money due, or to become due, said Indians to complete the irrigation system heretofore commenced on said Crow Indian Reservation.

Crow agreement.—Act April 27, 1904 (33 Stat., 367):

ART. II. * * * Ninety thousand dollars, or so much thereof as may be necessary, shall be expended, under the direction of the Secretary of the Interior, in the extension and completion, including the necessary laterals, of the system of irrigation now being constructed on said reservation.

One hundred thousand dollars shall be placed in the Treasury of the United States to the credit of the Crow Indians as a trust fund, the same to remain in the Treasury for 15 years and shall draw interest at the rate of 4 per cent per annum, said interest to be expended by the Secretary of the Interior in maintaining and managing said irrigation system: *Provided further*, That at the expiration of the 15 years above mentioned such disposition shall be made of said fund as the Indians, with the consent of the Secretary of the Interior, may determine.

* * * It is further agreed that in the construction of ditches, dams, canals, and fences no contract shall be awarded nor employment given to other than Crow Indians or whites intermarried with them, except that any Indian employed

in construction may hire white men to work for him if he so desires: *Provided further*, That nothing herein contained shall be construed to prevent the employment of such engineers or other skilled employees, or to prevent the employment of white labor where it is impracticable for the Crows to perform the same.

ART. V. The water from streams on that portion of the reservation now sold which is necessary for irrigating land actually cultivated and in use shall be reserved for the Indians now using the same so long as said Indians remain where they now live.

ART. VIII. The right to take out water upon the diminished reservation subject to any prior claim of the Indians thereto by reason of previous appropriation, and the right to construct, maintain, and operate dams, flumes, and canals upon and across the said diminished reservation for the purpose of irrigating lands within any portion of the ceded tract are hereby granted, such rights to be exercised by persons, companies, or corporations under such rules, regulations, and requirements as may be prescribed by the Secretary of the Interior.

SEC. 5. * * * the residue of such ceded lands except sections 16 and 36 or lands in lieu thereof, which shall be reserved for common-school purposes, and are hereby granted to the State of Montana for such purpose, shall be subject to withdrawal and disposition under the reclamation act of June 17, 1902, so far as feasible irrigation projects may be found therein. The charges provided for by said reclamation act shall be in addition to the charge of $4 per acre for the land, and shall be paid in annual installments as required under the reclamation act; and the amounts to be paid for the land shall be credited to the funds herein established for the benefit of the Crow Indians. If any lands in sections 16 and 36 are included in an irrigation project under the reclamation act, the State of Montana may select in lieu thereof, as herein provided, other lands not included in any such project, in accordance with the provisions of existing law concerning school-land selections. In any construction work upon the ceded lands performed directly by the United States under the reclamation act, preference shall be given to the employment of Crow Indians, or whites intermarried with them, as far as may be practicable: *Provided, however*, That if the lands withdrawn under the reclamation act are not disposed of within five years after the passage of this act, then all of said lands so withdrawn shall be disposed of as other lands provided for in this act. That the lands not withdrawn for irrigation under said reclamation act, which lands shall be determined under the direction of the Secretary of the Interior at the earliest practicable date, shall be disposed of under the homestead, town site, and mineral-land laws of the United States, and shall be opened to settlement and entry by proclamation of the President, which proclamation shall prescribe the manner in which these lands may be settled upon, occupied, and entered by persons entitled to make entry thereof; and no person shall be permitted to settle upon, occupy, or enter any of said lands, except as prescribed in such proclamation, until after the expiration of 60 days from the time when the same are opened to settlement and entry.

Act March 3, 1909 (35 Stat., 797). That any of the lands withdrawn under the reclamation act in pursuance of the provisions of section 5 of the act of Congress approved April 27, 1904, entitled, "An act to ratify and amend an agreement with the Indians of the Crow Reservation, in Montana, and make appropriations to carry the same into effect," which are not disposed of within five years from the date of the passage of said act shall remain subject to disposal under the provisions of the reclamation act until otherwise directed by the Secretary of the Interior.

Act May 25, 1918 (40 Stat. 574): That the Secretary of the Interior be, and he is hereby, authorized to withdraw from the Treasury of the United States the sum of $200,000 of any tribal funds on deposit to the credit of the Crow Indians in the State of Montana, and to expend the same for making necessary improvements to the irrigation systems in the Big Horn Valley on the Crow Reservation in Montana, said sum, or such part thereof as may be used for the purpose indicated, to be reimbursed to the tribe under such rules and regulations as may be prescribed by the Secretary of the Interior.

Act June 30, 1919 (41 Stat. 16): That the Secretary of the Interior be, and he is hereby, authorized to withdraw from the Treasury of the United States the sum of $150,000 of any tribal funds on deposit to the credit of the Crow Indians, in the State of Montana, and to expend the same for making necessary improvements to the irrigation systems in the Big Horn Valley on the Crow Reservation in Montana, said sum, or such part thereof as may be used for the purpose indicated, to be reimbursed to the tribe under such rules and regulations as may be prescribed by the Secretary of the Interior.

Act July 19, 1919 (41 Stat. 196): Of the sum of $150,000, which the Secretary of the Interior is authorized by the Indian appropriation act for the fiscal year 1920 to withdraw from the tribal funds of the Crow Indians in the State of Montana to be expended for making necessary improvements to the irrigation systems in the Big Horn Valley on the Crow Reservation in Montana, said sum, or such part thereof as may be used for the purpose indicated, to be reimbursed to the tribe under such rules and regulations as may be prescribed by the Secretary of the Interior, not to exceed $25,000 of this amount shall be available for expenses incurred during the fiscal year ending June 30, 1919.

Act February 14, 1920 (41 Stats. 408): Authorizes expenditure of $100,000 of Crow tribal moneys for improvements, maintenance, and operation of the Crow Reservation, including assessments payable to Two Leggins Water Users Association.

Act March 3, 1921 (41 Stats. 1225): Authorizes expenditure of $200,000 for improvements, maintenance, and operation, including maintenance on Two Leggins Canal for the Crow Reservation, providing that $150,000 of this shall be available for construction of a diversion dam on the Big Horn River and $50,000 for maintenance and operation.

Act May 24, 1922 (42 Stat. 559–580): Authorized expenditures of $125,000 for improvements, maintenance, and operation of irrigation systems on the Crow Reservation, including the Two Leggins Canal.

Act January 24, 1924 (42 Stat. 1174): Appropriated $175,000 from Treasury funds for improvement, maintenance, and operation of reservation project, in cluding Two Leggins and Bozeman Trail canals.

Act June 5, 1924 (43 Stat. 390): Appropriated $150,000 for improvements, maintenance, and operation of Crow Reservation projects, including Two Leggins and Bozeman Trail canals.

Act March 3, 1925 (43 Stat. 1146): Appropriated $16,000 for maintenance of projects on the Crow Reservation.

Act May 10, 1926 (44 Stat. 458): Appropriated $5,000 for maintenance and operation of the various projects on Crow Reservation.

Act January 12, 1927 (44 Stat. 934): Appropriated $1,000 for maintenance and operation of the various projects on the Crow Reservation.

4. HISTORY

The Crow Reservation came into existence as a result of the treaty of May 7, 1868. This treaty was ratified by Congress July 25, 1868. The original reservation boundary lines are contained in article 2 of the treaty.

On June 12, 1880, in an agreement between the United States Government and the Crow Tribe of Indians, the Indians ceded back to the United States certain lands described as follows, to wit:

Beginning in the mid-channel of the Yellowstone River at the point opposite the mouth of the Boulder Creek; thence up the mid-channel of said river to the point where it crosses the southern boundary of the Montana Territory, being the forty-fifth degree of north latitude; thence east along said parallel of latitude to a point where said parallel of latitude crosses Clarks Cork; thence north to a point 6 miles south of the first standard parallel, being on the township line between townships 6 and 7; thence west on said township line to the one hundred and tenth meridian to a point either west or east of the source of the eastern branch of Boulder Creek; thence down said eastern branch of Boulder Creek to the place of beginning.

The 1880 agreement provided for the payment by the United States Government to the Crow tribe of Indians the sum of $750,000, to be distributed in payments covering a period of 25 years. It also provided that all Indians living within the ceded territory could either remain on their land or accept new allotments on the reservation.

On December 8, 1890, the reservation was further reduced by agreement between the United States Government and the Crow Indians. This agreement was approved by act of Congress of March 3, 1891. The consideration named in this agreement was $946,000, which sum was to be used in the construction of irrigation ditches, the building of flour mills, school houses, and for other purposes.

In August, 1904, the United States Government entered into still another agreement with the Crow Indians. This agreement had congressional approval bearing date of April 27, 1904. By the terms of this agreement, the ceded land was not sold directly to the United States Government, but was thrown open to entry under existing laws. The Crow Indians were to receive the money

obtained from the sale of the ceded land. The United States Government was to disburse the money thus obtained from the sale of this acreage in construction of irrigation systems, the erection of schoolhouses, the building of fences, etc. There is due the Crow Indians from the sale of this land under the 1904 agreement something over $200,000.

The land within the present boundary of the Crow Reservation has all been allotted to individual Indains with the exception of certain mountainous lands lying in the southern and southwestern part of the reservation. The unallotted portion, of which there are approximately 300,000 acres, is in the Big Horn and Pryor Mountains.

There are 11 irrigation units on the Crow Reservation. In the construction and maintenance of these units only Crow money has been used, no Government funds having been expended. The units were constructed under Government supervision and are maintained and operated by the irrigation division of the Indian Bureau. The funds for construction, and for the operation and maintenance of the projects, aside from collections used, have been provided by congressional appropriations of Indian tribal funds. Beginning with the act of May 25, 1918 (40 Stat. 754), making appropriation of $200,000 from tribal funds for irrigation work in the fiscal year 1919, reimbursement to the tribal fund is provided for. Previous to that act nothing was said of reimbursement.

The Crow irrigation units are known as the Upper Little Horn No. 2, Forty Mile Ditch (40 miles from Fort Curtis), Lodge Grass Ditch No. 1, Lodge Grass Ditch No. 2, Reno Ditch, Agency Ditch, Big Horn Ditch, Pryor Creek Ditch, Soap Creek Ditch, Lost Creek Ditch, and Coburn Ditch.

The above-named ditches were constructed by the United Statse Government. The cost of construction and the cost of maintenance up to July 1, 1923, have all been paid entirely out of Crow funds, as provided by congressional enactment.

The appropriations for the Crow irrigation units for the fiscal year ending June 30, 1924, came from the United States Treasury, and are reimbursable, as Crow funds were nearly exhausted.

In addition to the above-named irrigation systems, the Crow Indians have an interest in the Two Leggins Ditch and in the Bozeman Trail Ditch. In securing the interest in these two latter-named ditches, Crow money was used.

5. LOCATION, TRANSPORTATION, AND MARKETS

State: Montana (southeastern part).

Counties: Big Horn and Yellowstone.

Townships: 1 to 9 south, range 25 to 38 east.

Railroads: The Chicago, Burlington & Quincy Railway runs through the reservation along the Little Big Horn River. The Bozeman Trail unit, Forty Mile unit, Lodge Grass No. 1 and No. 2 units, Reno unit, Agency units, and the Two Leggins units are on or very near the railroad. The largest unit, the Big Horn, is from 2 to 30 miles distant from the railroad.

Railroad stations: Crow Agency, Hardin, Lodge Grass, and Wyola.

Cities and towns: Hardin, population 1,000, on reservation; Billings, population 20,000, 10 miles from Lodge Grass unit; Sheridan, Wyo., 15,000, 50 miles from Upper Little Horn unit.

Highways and roads: Custer Battlefield Highway follows the line of the railway across the reservation and is surfaced with gravel. All other roads are unimproved.

Markets: Markets for farm produce are local. Stock is shipped to the eastern markets.

6. AREA AND CLASSIFICATION OF RESERVATION LANDS

Acreage in reservation as first established (estimated)	2, 313, 213
Acreage in reservation at present	2, 256, 463

Allotment was begun in 1890. All Indians were allotted without reference to age or sex and each one received, on the average, 600 acres. The total area allotted was 1,918,912 acres, and approximately 3,500 allotments made. Of this number, 1,426 were allotted on irrigable land, with a total of approximately 63,000 acres. Three hundred and two of these allotments have been sold. Approximately 1,500,000 acres are now held under trust patents. These Indians are not permitted to sell their entire allotments, but must retain at least 320 acres, if their allotments were made prior to 1920. In 1927 additional allot-

ments were selected for those born subsequent to 1920, and 52,020 acres on this schedule are awaiting approval.

In making the allotments the effort has been to give each Indian an equitable share of the value of the land, and for this purpose irrigable, dry farm, and grazing lands have been valued in the ratio of 4, 2, and 1, respectively. The price received by allottees for the land sold is estimated to be $8 per acre.

7. POPULATION AND HEALTH CONDITIONS

The Indians of this reservation are of the Crow Tribe.

	1920	1925	1927
Indian population	1,719	1,781	1,854
Indian births	61	60	76
Indian deaths	59	60	46
White population	1,200	1,000	1,200

Indians having tuberculosis (450 examined)	56
Indians having trachoma	444
Indian families living in permanent homes	307
Full-blood Indians	1,069
Less than full blood	785
Indians receiving rations	None

8. CLIMATE

Period covered by reliable records, 1879 to 1927.

Range in elevation of irrigable area, 2,500 to 3,500 feet.

Maximum temperature, 107°; minimum temperature, 48° below zero.

Average maximum temperature, 60°; average minimum temperature, 31°.

Average annual precipitation, 14.56; average annual rain, 9 inches; average annual snow, 44 inches.

Average date last killing frost, spring, May 15; average date first killing frost, fall, September 26.

Average growing season, 144 days.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(*a*) *Topography.*—No topographic survey of irrigable area has been made. Approximately 70 per cent of irrigable area is uniform as to slope and about 30 per cent is broken by isolated ridges or depressions.

Per acre cost of clearing, plowing, leveling and ditching smoothest lands of irrigable area, estimated $10, roughest lands, $50; average lands, $15.

(*b*) *Soil.*—No soil survey of irrigable area has been made. Practically all lands have a clay loam soil 3 to 10 feet or more in depth. Blue joint grass is the native vegetation.

(*c*) The following areas, formerly productive, have been rendered non-productive by seepage and alkali; no drainage has been provided:

Unit	Approximate acreage affected
Big Horn	320
Two Leggins	200
Lodge Grass No. 1	120
Reno	120
Agency	360
Total	1,120

(*d*) *Irrigation methods and water delivery.*—The furrow and wild flooding are the methods used in irrigating on this project. Water is furnished on demand. There are no measuring devices for ascertaining the head delivered.

(*e*) *Duty of water.*—No data available.

(*f*) *Average crop production.*—Alfalfa, 1.5 tons; barley, 17.5 bushels; sugar beets, 10 tons; corn, 22 bushels; native hay, 0.9 ton; oats, 24 bushels; potatoes, 102 bushels; wheat, 25 bushels.

10. WATER SUPPLY AND WATER RIGHTS

(*a*) *Source.*—The principal sources of water supply for the irrigation development on the Crow Indian Reservation are the following streams:

(1) The Big Horn River from which the Big Horn and Two Leggins Canals are diverted: This stream has a watershed of 20,720 square miles at an average elevation of about 5,000 feet. The maximum flow is 10,120 second-feet; minimum flow, 1,751; mean flow, 7,162.

(2) The Little Big Horn River, from which the Forty Mile, Bozeman Trail, Reno, Agency, and Upper Little Horn No. 2 Canals are diverted: This stream has a watershed of 1,275 square miles at an average elevation of 4,000 feet. The maximum flow is 631 second-feet; minimum, 116 second-feet; average, 441 second-feet.

(3) Lodge Grass Creek from which Lodge Grass Canals Nos. 1 and 2 are diverted: The maximum flow of this stream is 130 second-feet; the minimum, 13 second-feet; average, 76 second-feet.

(4) Soap Creek, from which the Soap Creek Canal is diverted: Maximum flow, 44 second-feet; minimum, 11 second-feet; average, 26 second-feet.

(5) Pryor Creek, from which the Pryor Creek Canals are diverted. Area of watershed, 800 square miles; average elevation, 4,000 feet. Maximum discharge of stream, 84 second-feet; minimum, 22 second-feet; average, 72 second-feet.

There are no storage reservoirs in connection with this irrigation development, but all canals are diverted from the natural flow of the streams.

(*b*) *Water rights.*—Water was first diverted into some of the Government-constructed ditches in 1893. Water filings in compliance with State laws have been made on the various streams and for the various canals beginning with 1905. On the Big Horn River there is a filing for 788 second-feet for the Big Horn Canal and of 600 second-feet for the Two Leggins Canal. On the Little Big Horn River there are filings of 72 second-feet for the Upper Little Horn Canal; 28 second-feet for the Forty Mile, 112 second-feet for the Reno; 167 second-feet for the Agency Canal. On Lodge Grass Canal there is a filing of 135 second-feet for Lodge Grass No. 1 and 46 second-feet for Lodge Grass No. 2. On Soap Creek the filing is for 46 second-feet; on Pryor Creek 87; on Lost Creek 60 and Coburn Canal 17 second-feet.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT, DESCRIPTION, AND SUMMARY OF PROJECT WORKS

(*a*) The project consists of 13 units as follows: Big Horn, Two Leggins, Soap Creek, Upper Little Horn No. 2, Bozeman Trail, Forty Mile, Reno, Agency, Lodge Grass No. 1, Lodge Grass No. 2, Pryor Creek, Coburn, and Lost Creek.

(*b*) Units of project:

Big Horn

Acreage arable	28,706.2.
Acreage irrigable	26,087.
Water supply	Big Horn River.
Main canal completed	1905.
Main canal capacity	720 second-feet.
Length of main canal	33.1 miles.
Length of laterals	92. 8 miles.
Structures	811 timber, 334 concrete.
Estimated cost of completed units	$1,577,608.35.
Estimated per acre completed	$55.
Construction cost June 30, 1927	$1,197,828.99.
Per acre construction cost	$41.72.
Per cent of project completed	75.

With one exception the principal structures on the main canal are of concrete. The numerous concrete drops necessary to take care of the excessive fall has added materially to the cost. The drops in the laterals are of concrete, but all the farm turnouts are of wood. Since 1918 about 40 per cent of this land has been leased in large bodies to one corporation, and the water has been taken from the main east and west laterals, constructed generally on section lines.

When the leases expire and the land is farmed by the allottees or to lessees who farm it in smaller areas, it will be necessary to build laterals to every 40-acre tract, and it is this expense that is included in the additional amount to complete the unit.

Two Leggins unit

Source of water supply	Big Horn River.
Means of diversion	Brush and concrete dam.
Acreage arable	5,642.
Area under constructed works	5,462.
Main canal completed	About 1908.
Main canal capacity	400 second-feet.
Length of laterals	23.9 miles.
Structures (in laterals)	13 timber.
Estimated cost of completed project	$108,827.42.
Estimated per acre cost	$19.25.
Construction cost June 30, 1927	$105,786.18.
Per acre constructed cost	$18.75.
Per cent completed	95.

This unit was constructed by a private company, the Government purchasing water for the 5,642.46 acres of trust Indian land. The United States Indian irrigation service constructed laterals to about 80 per cent of the Indian allotments.

The additional cost to complete project is for building laterals to allotments to which water has not been delivered. The private company alluded to constructed the main canal with the necessary structures and turnouts. About 50 per cent of the main canal structures are built of concrete.

Soap Creek unit

Source of water supply	Soap Creek.
Means of diversion	Brush and rock dam.
Acreage arable	1,816.8.
Acreage irrigable	1,681.5.
Main canal completed	1894.
Main canal capacity	240 second-feet.
Main canal length	7.5 miles.
Structures	13 timber, 12 concrete
Estimated cost of completed project	$121,132.50.
Estimated per acre cost	$67.
Construction cost June 30, 1927	$37,461.61.
Per acre construction cost June 30, 1927	$20.62.
Per cent completed	30.

No Government money used in the construction of laterals. With reference to leasing, the conditions on this unit are similar to those under the Big Horn; about 50 per cent of the area under this unit is leased to one corporation, who take the water from the main canal turnout. At the expiration of the lease it will be necessary to construct permanent laterals to each 80-acre tract. The estimate includes the expense of installing concrete drops. No surveys have been made to determine the estimated cost, and the above is only an approximation. Seventy-five per cent of the structures in the main canal are of concrete

Upper Little Horn No. 2 unit

Source of water supply	Little Big Horn River.
Means of diversion	Direct from river.
Acreage arable	3,361.2.
Acreage irrigable	2,811.5.
Main canal completed	About 1914.
Main canal capacity	115 second-feet.
Length of main canal	8.7 miles.
Storage	None required.
Length of laterals	5.7 miles.
Structures	111 timber, 92 concrete.
Estimated cost of completed project	$148,856.15.
Estimate per acre cost completed project	$46.

Construction cost to June 30, 1927	$134,700.67.
Per acre construction cost to June 30, 1927	$40.07.
Per cent completed	90.

The comparatively high cost per acre of this unit is due to the excessive slope of the land, 30 to 40 feet to the mile. To a certain extent this also applied to the main ditch, but conditions are such that concrete chutes could be installed to take care of the excessive fall instead of drops. There are also a number of large flumes of considerable length on the main canal and these added materially to the cost. The cost to complete project is for building laterals to allotments to which water has not been delivered, most of these allotments lying along the river.

Bozeman Trail Ditch

Source of water supply	Little Big Horn River.
Means of diversion	Direct from river.
Acreage arable	1,961.3.
Acreage irrigable	1,961.3.
Main canal completed	1922.
Main canal capacity	70 second-feet.
Length of main canal	10 miles.
Storage	None.
Construction cost June 30, 1927	$24,004.51.
Acre construction cost	$12.27.

This is the area of trust Indian lands under the ditch for which the Government purchased water from a private company who constructed the main ditch. No laterals have been constructed by the Government, the water being delivered by the company from the main canal turnouts.

Forty-mile unit

Source of water supply	Little Big Horn.
Means of diversion	Direct from river.
Acreage arable	1,059.5.
Acreage irrigable	938.4.
Main canal completed	1896.
Main canal capacity	100 second feet.
Length of main canal	4.1 miles.
Storage	None.
Length of laterals	4.2 miles.
Structures	40 timber, 3 concrete.
Estimated cost completed project	$21,338.72.
Estimate per acre cost completed project	$21.
Construction cost June 30, 1927	$12,821.19.
Acre construction cost June 30, 1927	$12.10.
Per cent completed	60.

The amount to complete project includes the replacement of the timber structures in the main ditch by concrete and the reconstruction of the lateral system. Large cottonwood trees have grown in the laterals constructed in 1895, and they are so close together in one or two of the laterals that it would be cheaper to construct new laterals. The early laterals were built without any regard to subdivision lines, and in rebuilding it would be desirable to locate the laterals along the property lines where it is possible to do so. At the present time there is not a great deal of land being irrigated and it is possible to supply enough water through the old laterals, but if the land is ever intensively farmed it will probably be necessary to cut out the large cottonwood trees or build new laterals. There are several allotments to which no laterals have ever been constructed.

Reno unit

Source of water supply	Little Big Horn River.
Means of diversion	Brush and rock dam.
Acreage arable	3,619.9.
Acreage irrigable	3,019.2.
Main canal completed	1919.
Main canal capacity	85 second-feet.

Length of main canal	9.8 miles.
Storage	None.
Length of laterals	13.1 miles.
Structures	129 timber, 54 concrete.
Estimated cost completed project	$103,772.40.
Estimated per acre cost	$29.
Construction cost June 30, 1927	$96,817.38.
Acre construction cost June 30, 1927	$26.75.
Per cent completed	75.

All of the structures in the main canal, with the exception of two or three turnouts and the bridges, are constructed of concrete and steel. All drops in the laterals are of concrete. The cost to complete project represents the expense of building laterals to allotments to which no water has been delivered and the area is the difference between acreage arable and acreage irrigable.

Agency unit

Source of water supply	Little Big Horn.
Means of diversion	Concrete dam.
Acreage arable	6,113.9.
Acreage irrigable	5,324.1.
Main canal completed	About 1895.
Length of main canal	10.9 miles.
Main canal capacity	209 second-feet.
Storage	None.
Length of laterals	32.5.
Structures	244 timber, 56 concrete.
Estimated cost completed project	$159,703.96.
Estimated cost per acre completed project.	$27.
Construction cost June 30, 1927	$146,324.44.
Acre construction cost June 30, 1927	$23.93.
Per cent completed	90.

The estimated additional amount to complete project is for the replacement of a number of timber structures in the main canal by concrete, to reconstruct some of the laterals built in 1896 and 1897 and which were not located on subdivision lines, and to construct laterals to allotments to which no water has been delivered. Most of the allotments, to which no laterals have been constructed, are adjacent to or near the river and the work will be comparatively expensive on account of the rough topography. There are several timber structures in the laterals, such as drops, that will have to be replaced by concrete.

Lodge Grass No. 1 unit

Source of water supply	Lodge Grass Creek.
Means of diversion	Brush and rock dam.
Acreage arable	4,876.
Acreage irrigable	3,921.7.
Main canal completed	About 1896.
Main canal capacity	200 second-feet.
Length of main canal	13 miles.
Storage	None.
Length of laterals	26 miles.
Structures	177 timber, 11 concrete.
Estimated cost completed project	$143,993.03.
Eastern cost per acre completed project	$29.
Construction cost June 30, 1927	$113,195.88.
Per acre construction cost June 30, 1927	$23.21.
Per cent completed	75.

The estimated additional amount to complete project covers the expense of replacing several timber structures in the main canal by concrete and the construction of laterals to allotments to which no water has been delivered. There are practically no concrete structures in the laterals that are now built. The proposed lateral construction will be comparatively high in cost on account of the rough condition of the land through which they will have to be constructed.

Lodge Grass No. 2 unit

Source of water supply	Lodge Grass Creek.
Means of diversion	Brush and rock dam.
Acreage arable	1,606.
Acreage irrigable	898.
Main canal completed	1925.
Main canal capacity	37 second-feet.
Length of main canal	4.4 miles.
Structures	23 timber.
	28 concrete.
Estimated cost of completed project	$68,975.83.
Estimated acre cost completed project	$44.
Construction cost June 30 1927	$55,385.84.
Acre construction cost June 30, 1927	$33.48.
Per cent completed	70.

The estimated additional amount to complete includes the cost of building laterals to allotments to which water can not be delivered at the present time. There is a considerable amount of fall to the land which will make it necessary to install a number of drops in the laterals and this condition necessitated the installation of a number of drops and chutes in the main ditch. The comparatively high cost of construction per acre is due to the fact that all the drops and chutes were built of concrete, the material for which had to be hauled an average of eight miles. Most of the ditch work was side hill construction.

Pryor Creek units

(This includes Pryor, Lost Creek, and Coburn units)

Water supply	Pryor and Lost Creeks.
Means of diversion	Brush and rock dam.
Acreage arable	4,465.32.
Acreage irrigable	3,877.71.
Main canal completed	About 1895.
Main canal capacity	20 second-feet.
Length of main canal	9.2 miles.
Length of laterals	17.3 miles.
Strictures	79 timber, 2 concrete.
Estimated cost completed project	$136,699.62.
Estimated acre cost completed project	$30.
Construction cost June 30, 1927	$51, 867.79.
Acre construction cost June 30, 1927	$11 62.
Per cent completed	40.

The estimated additional cost to complete project covers the cost of replacing the diversions and other structures in the main ditches by concrete, practically rebuilding the Coburn subunit, relocating and rebuilding laterals so that they will be on subdivision lines, and constructing laterals to allotments to which no water has ever been delivered.

12. SUMMARY OF PROJECT WORKS

(*a*) *Storage reservoirs.*—None.

(*b*) *Diversion structures.*—Two concrete; eight brush and rock; five concrete wing dam.

(*c*) *Canal structures.*—Costing over $2,000 each, 26 concrete. 2 masonry, 12 wood; costing $500 to $2,000 each, 164 concrete, 5 wood; costing from $100 to $500 each, 342 concrete, 53 wood; costing less than $100 each, 16 concrete, 1,564 wood.

Bridges, 342 wood, 16 concrete.

Culverts, 81 wood, 30 concrete, 16 steel.

Flumes, steel. 32; range in size, 48 to 240 inches; total length, 5,428 feet.

Flumes, wood, 11; range in size, 1 to 18 square feet; total length, 1,560 feet.

(*d*) *Irrigation canals and laterals*

Capacity 500 to 1 000 second-feet (miles)	33. 1
Capacity 100 to 250 second-feet (miles)	78. 6
Capacity 15 to 50 second-feet (miles)	197. 1
Capacity less than 15 second-feet (miles)	12. 7
	321. 5

(*e*) *Drains.*—None.

(*f*) *Buildings.*—One office, 19 residences, 6 barns, 8 warehouses; Approximate value $35,000.

(*g*) *Telephone system.*—Miles of line, 40.9; stations, 20.

13. AREA AND UTILIZATION OF IRRIGABLE LANDS

(*a*) *Utilization of Government project lands (entire project)*

Entire project	1924	1925	1926
1. Acreage arable [1]			62, 229
2. Acreage irrigable [2]	52, 231	56, 030	56, 163
3. Acreage irrigated	20, 372	22, 682	8, 369
4. Acreage cultivated			[3] 23, 867
5. Total crop value	$391, 173	$419, 857	$455, 553
6. Average acre crop value	$15	$15	$17
7. Indians farming	181	148	150
8. Lessees farming	117	140	150
9. White owners farming	81	57	70
10. Under canal but dry farmed	11, 599	996	21, 630

(*b*) *Utilization of land owned by Indians and not leased (Government project) (farmed by Indians)*

	1924	1925	1926
1. Acreage irrigable	41, 813	43, 207	43, 155
2. Acreage irrigated	4, 989	2, 703	535
3. Acreage cultivated			4, 204
4. Families farming	181	148	150
5. Cultivated per family			28
6. Total crop value	$63, 874	$42, 151	$50, 906
7. Crop value (acre)	$10	$9	$12
8. Crop value (family)	$352	$217	$339

(*c*) *Utilization of land owned by Indians and leased (Government project) (farmed by lessees)*

	1924	1925	1926
1. Acreage irrigated	10, 925	14, 281	4, 674
2. Acreage cultivated			14, 307
3. Number of lessees	117	140	150
4. Total crop value	$259, 963	$300, 549	$299, 969
5. Crop value (acre)	$20	$21	$21

[1] Acreage arable: Ultimate irrigable acreage when project is completed.
[2] Acreage irrigable: Now under constructed works.
[3] Excess of acreage cultivated over acreage irrigated is the acreage under canal that was dry farmed.

14. PRINCIPAL CROPS, CROP YIELDS, AND RETURNS

(a) *Detailed crop data project lands farmed (1927)*

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre	Total value
Indian farmers:					
Alfalfa	1,368	1.37	$7.35	$10.07	$13,786.06
Clover	116	.92	7.39	6.82	792.00
Hay	929	.79	6.08	4.81	4,470.00
Oats	367	22.27	.50	11.13	4,086.50
Wheat	1,313	15.46	1.10	17.00	22,337.70
Miscellaneous	111			46.24	5,133.45
	[1] 4,204			12.27	50,905.65
Lessees:					
Alfalfa	2,735	1.74	7.23	12.70	34,758.00
Barley	401	24.60	.60	14.70	5,919.00
Beans	302	9.80	2.40	23.52	7,108.80
Beets, sugar	661	11.92	8.50	101.32	66,980.00
Hay	749	1.06	5.93	6.29	4,725.00
Oats	1,090	25.85	.50	12.92	14,089.50
Wheat	8,004	17.46	11.10	19.20	153,749.20
Miscellaneous	365			34.63	12,639.10
	[2] 14,307			20.95	299,968.60
White owners:					
Alfalfa	1,368	1.91	7.01	13.39	18,279.00
Hay	430	1.04	6.44	6.70	2,887.00
Oats	439	30.24	.50	15.12	6,638.50
Wheat	2,731	18.28	1.10	20.11	54,918.60
Miscellaneous	408			53.18	21,695.50
	5,376			19.47	104,678.60

[1] Of the 4,204 acres farmed, only 535 acres were irrigated.
[2] Of the 14,307 acres farmed, only 4,674 acres were irrigated.

15. ECONOMIC CONDITIONS AMONG PROJECT FARMERS (INDIANS)

	1924	1925	1926
1. Number of Indian farms	230	250	300
2. Indian families farming	(1)	(1)	245
3. Livestock: Horses, beef cattle, dairy cattle, sheep, hogs	[3] $241,009	[3] $241,009	[4] $150,605
4. Estimated value, livestock per farm	$1,047	$964	$614
5. Equipment: Plows, mowers, tractors, truck, autos	[2] $64,179	[3] $64,179	[4] $78,425
6. Estimated value, equipment per farm	$279	$256	$320
7. Acreage farmed by Indians	(1)	(1)	10,045
8. Acreage farmed per family	(1)	(1)	[5] 41
9. Average crop value per acre	(1)	(1)	$8.49
10. Average crop value per family	(1)	(1)	$350
11. Per acre cost, assessment against Indians (per cent)	5	5	[6]
12. Per acre, operation and maintenance assessments against Indians	$1.50	$1.40	$1.00
13. Acres, Indian land leased:			
Irrigated, estimated	20,000	20,000	20,000
Not irrigated (farm), estimated	150,000	150,000	160,000
14. Average rental per acre:			
Irrigated	$3.50	$3.00	$3.00
Not irrigated (farm)	$1	$1	$1
15. Approximate total rental	$300,000	$300,000	$300,000
16. Indian land sold:			
Irrigable	40	160	40.06
Not irrigable	3,023.97	4,916.68	7,446.87
17. Average sale price per acre, irrigable	$10	$22	$20
18. Approximate total sale price	$18,661	$46,352	$51,539
19. Number Indians receiving payments from timber, agricultural, and grazing leases, oil, power, etc	1,854	1,800	1,800
20. Average per capita payment from above funds (estimated)	$150	$150	$150
21. Average total payment to Indians from above sources	$250,000	$250,000	$250,000
22. Indian reimbursable indebtedness	$56,389	$36,398	$41,339
23. Amount paid on reimbursable indebtedness	$24,485	$7,502	$10,742
24. Number of Indians receiving rations	None.	None.	None.
25. Indian tribal fund (amount)			[7] $89,559
26. Source of tribal fund: Grazing fees, tribal land.			

[1] No record. [2] Fiscal year 1925. [3] Fiscal year 1926. [4] Fiscal year 1927. [5] Average.
[6] Modified act May, 1926. Assessments not fixed under this act.
[7] As of June 30, 1927.

16. PROJECT OPERATION AND MAINTENANCE

(a) *Organization*

Employees:	Salary
Project engineer (1)	$3,100
Instrument man and clerk (1)	1,860
Ditch riders (9)	1,440

All ditch riders are employed throughout the year. Quarters, fuel, and light are supplied. Both horses and autos are used in patroling the systems, but mostly horses, which are furnished by the ditch riders. No Government autos are furnished ditch riders.

(b) *Annual expense.*—Total expenditure for operation and maintenance during fiscal year 1927, $68,727.18.

(c) *Comparison with neighboring irrigation projects, either Government, corporate, or private*

	As to—	
	Crow project	Two Leggins
Elevation	3,300 feet	3,300 feet.
Growing season	144 days	144 days.
Soil	Clay loam	Clay loam.
Water supply	Big Horn and tributaries	Big Horn.
Crops grown	Hay, grain, beets	Hay, grain, beets.
Per acre crop value	$19	No data.
Quality of construction	Mostly concrete	50 per cent concrete.
Total construction cost	$1,978,408.10	No data.
Annual per acre construction assessment	About $1.50	Paid up.
Annual per acre operation and maintenance assessment (1926).	$1 [1]	$1.[2]
Per cent of irrigable land cultivated	35 per cent	About 70 per cent.

[1] Main canals and laterals. [2] Just for main canal.

17. PROJECT FINANCES

(a) *Construction cost and collections to June 30, 1927*

Reimbursable moneys	$2,016,865.77
Less inventory	37,930.78
Total construction cost	1,978,934.99
Estimated cost to complete for 63,228.65 acres, the total proposed ultimate area	2,590,907.98
Present cost per acre for 56,163.20 acres	31.00
Estimated per acre cost when completed	50.00
Per acre value of land without irrigation	25.00
Per acre value, land when irrigated	75.00
Increased per acre value by irrigation	50.00

Unit or division of project	Estimated cost to complete project	Per acre to date	Per acre when complete	Increased per acre irrigated
Big Horn	$1,577,608.85	$41.72	$55.00	$35.00
Soap Creek	121,132.50	20.62	67.00	55.00
Agency	159,703.96	23.93	27.00	66.00
Reno	103,772.40	26.75	29.00	65.00
Lodge Grass	143,993.03	23.21	29.00	62.00
Pryor Creek	136,699.62	11.62	30.00	35.00
Upper Little No. 2	148,856.15	40.07	46.00	50.00
Two Leggins	108,827.42	18.75	19.25	65.00
Forty Mile	21,338.72	12.10	21.00	50.00
Bozeman Trail		12.27		50.00
Lodge Grass No. 2	69,975.83	34.48	44.00	45.00

(*b*) *Collection of construction cost.*—An effort has been made to collect construction cost assessments under the provisions of the act of June 4, 1920, but with very little success. The attempt to collect resulted in a law suit, which held the matter in abeyance.

The act of May 26, 1926, amends the act of June 4, 1920, and removes large sums from the reimbursable status. When the actual, reimbursable charge, in accordance with the act of May 26, 1926, is announced by the Secretary of the Interior, it will undoubtedly result in removing the greater portion of the accruals as now written up in the Crow project water-users ledgers.

The following table gives assessment accruals, payments and delinquencies by units.

Unit	Total construction assessments to date	Total construction collections to date		Total construction delinquencies to date
		Indians	Whites	
Big Horn	$281,704.18	$101.23	[1] $605.50	$281,101.33
Soap Creek	10,525.54			10,526.54
Agency	35,470.65		315.22	35,155.43
Reno	23,285.01		15.41	23,269.60
Lodge Grass	25,241.31	27.30	[2] 401.05	24,957.21
Pryor Creek	11,226.60		50.03	11,176.57
Upper Little No. 2	24,310.35	268.94		24,041.41
Two Leggins	27,659.08		120.29	27,538.79
Bozeman Trail	7,614.87	2,884.49		4,730.38
Lodge Grass No. 3 [3]				

[1] This includes $103.88 advance payments.
[2] This includes $144.25 advance payments.
[3] No construction assessments made.

(*d*) *Operation and maintenance collections to June 30, 1927.*—The area to which water can be delivered is used as the basis for computing the per acre annual operation and maintenance assessments, which assessments are made for one year, due the date made—December 1—of each year. Collections are made of all landowners under constructed works and lessees on Indian lands and in order to enforce collections, the delivery of water is refused and 7 per cent interest charged on delinquencies. In order to compute operation and maintenance assessments, the total operation and maintenance cost for one fiscal year is divided by the total area under constructed works and this method has been found to be fair and satisfactory.

Total operation and maintenance assessments to date	$596,096.02
Total operation and maintenance collections to date	249,241.12
Total operation and maintenance collections to date from—	
Indians	27,915.35
White owners	91,908.42
Lessees	129,617.35
Total operation and maintenance delinquencies to date	346,854.90
Total penalties on delinquencies to date	3,064.68

	1924	1925	1926
Per acre operation and maintenance assessments on—			
Indian land not leased	$1.50	$1.40	[1] $1.00
Indian land leased	1.50	1.40	[1] 1.00
White-owned land	1.50	1.40	[1] 1.00

	1925	1926	1927
Operation and maintenance collections on—			
Indian land not leased	$572.82	$2,279.78	$287.50
Indian land leased	12,372.52	7,056.12	6,341.79
White-owned land	10,661.17	9,907.53	8,303.05
Operation and maintenance delinquencies on—			
Indian land not leased	48,621.03	43,789.78	33,636.24
Indian land leased	1,564.22	4,838.50	22,922.56
White-owned land	5,736.19	6,323.10	9,631.86
Rate of penalty on delinquencies (per cent)	7	7	7

[1] Assessments due Dec. 1, 1926 included 50 cents additional as one-half of estimated charge for 1927.

SUMMARY

Unit or division of project	Total operation and maintenance cost to date	Total operation and maintenance assessments to date	Total operation and maintenance collections to date	Total operation and maintenance collections to date		
				Indians	Lessees	White
Big Horn	$541,265.27	$289,509.52	$149,065.18	$11,935.64	$83,736.48	$53,393.06
Soap Creek	43,143.54	19,350.31	7,770.72	448.68	3,611.54	3,710.50
Agency	129,205.77	58,788.01	26,906.36	3,529.73	15,211.30	8,165.33
Reno	28,922.10	32,542.03	10,287.18	932.35	4,107.56	5,247.27
Lodge Grass No. 1	66,740.56	44,909.04	14,393.85	2,687.78	7,288.61	4,417.46
Pryor Creek	39,051.09	42,181.66	4,304.50	1,956.40	1,591.73	756.37
Upper Little Horn No. 2	34,927.48	30,080.18	18,755.01	4,094.65	3,693.00	10,967.36
Two Leggins	71,774.21	60,381.62	11,179.26	2,060.32	8,543.02	575.92
Forty Mile	25,448.44	11,065.75	3,124.98	268.74	452.70	2,403.54
Boseman Trail	3,534.79	2,876.16	8.80	1.06	7.74	
Lodge Grass No. 2	738.13	1,347.06	380.50		202.00	178.50
Total	984,751.38	393,031.34	246,176.34	27,915.35	128,445.68	89,815.31

NOTE.—These amounts include advance payments. These operation and maintenance cost figures do not include a charge of $26,533.20 included in project costs charged to miscellaneous ditches.

Total construction assessments to date	$450,327.27
Per acre annual construction assessment: 5 per cent of construction cost as of June 30, of each year.	
Total construction collections to date	4,789.46
Total construction collections to date from—	
Indians	397.47
White owners	1,507.50
Lessees	2,884.41
Total construction delinquencies to date	445,567.81

No penalties are charged on delinquent construction assessments.

(c) *Operation and maintenance cost and collections to June 30, 1927*

Expended from the following funds:	
Reimbursable moneys	$839,819.19
Maintenance collections	171,465.39
Total, operation and maintenance cost to June 30, 1927	1,011,284.58

Unit	Total operation and maintenance delinquencies to date			
	Indians	Lessees	Whites	Total
Big Horn	$108,522.42	$14,740.40	$17,000.18	$140,865.10
Soap Creek	9,772.05	1,332.43	513.56	11,618.04
Agency	28,682.00	1,801.71	1,569.87	32,053.58
Reno	20,542.97	894.46	865.21	22,302.64
Lodge Grass No. 1	26,384.66	1,365.95	2,885.00	30,655.61
Pryor Creek	33,650.42	2,429.03	1,814.71	37,894.16
Upper Little Horn No. 2	8,073.55	489.08	2,860.64	11,423.27
Two Leggins	37,684.01	8,992.27	2,526.08	49,202.36
Forty Mile	7,381.47	51.75	517.55	7,950.77
Bozeman Trail	2,353.07	514.29		2,867.36
Lodge Grass No. 2	736.06	196.00	34.50	965.56
Total	283,782.78	32,827.37	31,187.30	347,797.45

This statement does not include penalties accrued on delinquent assessments of $3,064.78.

Operation and maintenance assessments and collections.—The operation and maintenance assessments on the Crow Reservation for the years 1920 to 1922, inclusive, were fixed at $1 per acre against all land to which water could be delivered. These assessments were due on or before November 30, following the irrigation season. No water was to be delivered until all delinquent charges had been paid. Leases made covering Indian-owned land prior to 1921 for 10-year

periods were not required to pay any operation and maintenance charges for the first five years of the lease, and only $0.60 for the remaining five years. By telegram of April 29, 1922, the Indian Office authorized water to be delivered when a water user had given a chattel mortgage covering delinquent charges. This provision was continued for the season of 1922 and the charges for 1922 were also fixed at $1 per acre for all land under constructed ditches.

On August 17, 1923, the Secretary of the Interior fixed the charges on all irrigable land after an irrigable survey was made, at $1 for each acre, payable November 30, with a penalty of 7 per cent. The penalty applies only to fee patented land.

In February 20, 1924, the department extended the regulation of April 29, 1922, allowing water to be furnished if a chattel mortgage was made.

On September 10, 1924, the Secretary of the Interior fixed the operation and maintenance charges for the calendar year 1924 at $1.50 per acre against all irrigable land with due date of November 30, 1924, and 7 per cent penalty.

On September 26, 1925, the Department of the Interior fixed the operation and maintenance charges for the calendar year at $1.40 per acre against all irrigable lands. Notice was given that future assessments were to be made payable in advance of the use of water.

On September 27, 1926, the department fixed the operation and maintenance charges for the calendar year 1926 at 70 cents for the Boseman Trail ditch and 60 cents for 1927; for the Indian land under the Two Leggins ditch at $1.05 for 1926 and $1 for 1927; and on the remaining units at $1 for 1926 and 1927. The total of the 1926 assessment and half of the 1927 assessment were due and payable December 1, 1926, with interest at 7 per cent.

On October 4, 1927, the Secretary of the Interior fixed the operation and maintenance assessment on the Boseman Trail ditch at 30 cents for 1927 and 50 cents for 1928; the Two Leggins ditch at 50 cents for 1927 and $1 for 1928; and 50 cents for 1927 and $1 for 1928 on the remaining units against all irrigable land. These assessments were due and payable December 1, 1927, and delinquent March 1, 1928, with 7 per cent penalty against all delinquent assessments except on trust patented land. No water was to be furnished until all delinquent assessments were paid.

By telegram of April 29, 1922, the Indian Office authorized the project management to continue to supply water to white water users on Crow Reservation, taking chattel mortgages to secure payment of charges from those without funds.

On August 17, 1922, the operation and maintenance charges for Crow Reservation were fixed at $1 per acre.

On March 15, 1923, the Secretary of the Interior agreed to accept notes and deliver water before payment of delinquent charges.

On August 17, 1925, the operation and maintenance charges on irrigable land were fixed at $1 per acre, with 7 per cent penalty if not paid on or before November 30, 1923, on all white-owned land or patented in fee Indian land.

On February 20, 1924, the Indian Office, with the approval of the Secretary of the Interior, approved an extension of the order of March 15, 1923, allowing delivery of water upon receipt of a note executed by the landowner.

On April 10, 1923, the office, with the approval of the Secretary, approved a modification of general instructions issued June 21, 1920, allowing assessments to be made on the acreage considered irrigable after an irrigable survey shall have been made, instead of the area to which ditches are constructed.

On September 10, 1924, the Indian Office, with the approval of the Secretary, fixed the operation and maintenance charges for the calendar year 1924 at $1.50 per acre with a penalty of 7 per cent if not paid by November 30, 1924.

On September 26, 1925, the office with the approval of the Secretary, fixed the operation and maintenance charges for the calendar year 1925 at $1.40 per acre for all irrigable lands.

On September 27, 1926, the office, with the approval of the Secretary, fixed the operation and maintenance charges for the calendar year 1926 at 70 cents for Bozeman Trail ditch and $1.05 for Two Leggins ditch; and for 1927, 60 cents for Bozeman Trail ditch and $1 for Two Leggins ditch; and on the remaining units $1 for 1926 and 1927. These assessments were payable December 1, 1926, with interest at 7 per cent. All of the assessments for 1926 and half of the assessments for 1927 were payable December 1, 1927.

On October 4, 1927, the office, with the approval of the Secretary, fixed the operation and maintenance charges for the calendar year on all units except Bozeman Trail ditch and Two Leggins unit at 50 cents for 1927 and $1 for 1928. Charges on Bozeman Trail ditch were fixed at 30 cents for 1927 and 50 cents for

1928, and on Two Leggins unit at 50 cents for 1927 and $1.25 for 1928. All assessments were due and payable December 1, 1927, and delinquent March 1, 1928. Indian land held under trust patent was not subject to penalty. No water was to be furnished to land against which there were delinquent charges.

18. PROJECT DEFECTS, PROBLEMS, AND COMPLAINTS

Reimbursement of construction cost.—The Crow Reservation was established by treaty between the United States and the Crow Tribe of Indians concluded May 7, 1868, and subsequently duly ratified by the Senate of the United States, and regularly proclaimed by the President of the United States.

By act of March 3, 1891 (26 Stat. 1040), the United States in consideration of the cession to it of certain lands by the Crow Tribe of Indians as individuals and as heads of families agreed to pay therefor the sum of $946,000, $200,000 of which was by agreement set aside by the United States and appropriated for the special purpose of constructing irrigation systems upon the Big Horn and Little Big Horn Rivers and on Pryor Creek, and such other streams of the reservation as might be determined upon by the Secretary.

The Crow Reservation irrigation systems were begun under authority of the act of March 3, 1891 (26 Stat. 1040). The original appropriation was $200,000 from tribal funds of the Crow Indians. No provision was made for reimbursement.

By act of March 1, 1899 (30 Stat. 947), reenacted in 1900 (31 Stat. 247), Congress authorized the Secertary, with the consent of the Crow Indians, to use Crow tribal annuity funds to "complete the irrigation system theretofore" commenced. No provision was made for reimbursement.

Act of April 27, 1904 (33 Stat. 357) appropriated a further sum of $90,000 from tribal funds to be expended "in the extension and completion including necessary laterals, of systems of irrigation now being constructed on said reservation." No provision was made for reimbursement.

Act of May 25, 1918 (40 Stat. 574) authorized the expenditure of $200,000 from tribal funds for "making necessary improvements to irrigation system in Big Horn Valley on Crow Reservation, said sum or such part thereof as may be used for the purpose indicated to be reimbursed to the tribe under such rules and regulations as may be prescribed by the Secretary."

The act of June 30, 1919 (41 Stat. 16), appropriated $150,000 of tribal funds "for making necessary improvements to the irrigation system in Big Horn Valley of Crow Reservation to be reimbursed to the tribe * * *.

The act of July 10, 1919 (41 Stat. 196) appropriated $150,000 of tribal funds of the Crow Indians for necessary improvements to irrigation systems, to be reimbursed.

Act of February 14, 1920 (41 Stat. 421) ,appropriated $100,000 of tribal funds for improvement, maintenance, and operation systems on Crow Reservation, to be reimbursed to the tribe.

The act of March 3, 1921 (41 Stat. 1237), appropriated $200,000 of tribal funds for improvement, maintenance, and operation of irrigation systems to be reimbursed to the tribe.

The act of May 24, 1922 (42 Stat. 571), appropriated $125,000 of tribal funds for improvement, maintenance, and operation, to be reimbursed to the tribe.

By the act of August 1, 1914 (38 Stat. 583), Congress, for the first time, took cognizance of the situation that only a portion of the allotments belonging to individual Indians on various reservations could be irrigated from the irrigation works being constructed, and determined that the individual owners whose lands were irrigated, should pay the costs of construction. This act is of doubtful application to the Crow irrigation systems as it purports to apply only in those cases where the costs have been made reimbursable out of tribal funds. It was not until the act of May 25, 1918 (40 Stat. 574) that Congress made provisions for reimbursing the tribal funds of the Crow Indians. Thereafter, all appropriations for construction, maintenance, and operation carried the reimbursable proviso.

In the general act of February 14, 1920 (41 Stat. 409), Congress authorized and directed the Secretary "to require the owners of irrigable land under any irrigation system heretofore or hereafter constructed for the benefit of Indians and to which water for irrigation purposes can be delivered, to begin partial reimbursement of the construction charges, where reimbursement is required by law, at such times and in such amounts as he may deem best."

The above act was closely followed by the act of June 4, 1920 (41 Stat. 571), which made special provision for collection of costs of irrigation systems on the Crow Reservation and provided also that "all expenditures for irrigation works on Crow Reservation heretofore or hereafter made are hereby declared to be reimbursable under such rules and regulations as the Secretary may prescribe and shall constitute a lien against the land benefited regardless of ownership, and including all lands that have heretofore been sold or patented."

Under the provisions of the general allotment act of February 8, 1887 (24 Stat. 388), and acts amendatory thereof and supplemental thereto, certain lands of Crow Indian Reservation were duly allotted, beginning in 1890, to certain members of the tribe.

Of these lands, 2,451.8 acres, more or less, came into ownership of one Fred M. Heinrich, either through purchase at Government sales of deceased and noncompetent allotments, or by purchase from fee patentees and transferees of patentees, or both.

In accordance with the provisions of section 8 of the act of June 4, 1920 (41 Stat. 753), the Secretary prescribed rules and regulations for payment of the cost of constructing such irrigation system and fixed an annual charge of 5 per cent. The first charge being based on construction cost as of June 30, 1920, and a like charge of 5 per cent on the construction cost as of June 30 of each and every year until otherwise provided, payment of said charge being required on or before November 15 of the then current year. As computed in accordance with regulations prescribed by the Secretary, Frank M. Heinrich was indebted in the sum of $2,897.84 for the year 1920, $3,394.83 for 1921, and $3,860.71 for 1922, with interest at the rate of 6 per cent from the 15th day of November of each respective year.

Of the 61 allotments owned by Heinrich, 58 were acquired prior to the act of May 25, 1918 (40 Stat. 574), which act for the first time carried the reimbursable provision.

Suit for the collection of the foregoing amounts claimed to be due form Heinrich was brought by the United States in the Federal district court for the State of Montana. The decision was adverse to the claims of the Government. The matter was then appealed by the United States to the Circuit Court of Appeals for the Ninth District.

In the meantime, Congress passed the act of May 26, 1926, amending section 8 of the act of June 4, 1920, so that the part thereof concerning collections reads as follows:

" 'That any allotment or part of allotment provided for under this act, irrigable from any irrigation system new existing or hereafter constructed by the Government on said reservation, shall beat its pro rata share, computed on a per acre basis, of the expenditures made from tribal funds that were used in consturcting such systems where the Indians in council had not specifically approved such expenditures, and all moneys except gratuities expended on the construction of such irrigation systems out of the appropriations from the Treasury of the United States, the amount so in the aggregate to be borne to be ascertained and proclaimed by the Secretary of the Interior * * *. The expenditures for irrigation work on the Crow Reservation, Mont., heretofore or hereafter made, as hereinbefore provided, are hereby declared to be reimbursable under such rules and regulations as the Secretary of the Interior may prescribe and shall constitute a lien against the land benefited, regardless of ownership, including all lands which have heretofore been sold or patented.'

"That is, under the law as amended, only the expenditures on the irrigated systems of the Crow Reservation are reimbursable where they were made from tribal funds and were not specifically approved by the Indians in council, or were moneys, except gratuities, out of the appropriations from the Treasury of the United States. The act, as amended, further provides that the amount so in the aggregate to be borne, is to be ascertained and proclaimed by the Secretary of the Interior."

It was held by the circuit court that the act of May 26, 1926, removed the Government's cause of action.

A determination of the amounts expended for the construction of the Crow irrigation systems that are reimbursable under the provisions of the act of May 26, 1926, is now being made by the Crow project management. It is tentatively estimated by the supervising engineer at Billings, Mont., that of the $1,978,934.99, representing the cost of the project up to June 30, 1927, about $235,000 will be found to be reimbursable.

Wasteful construction.—Money for the construction and for the operation and maintenance of the irrigation works on the Crow Indian Reservation has been taken almost entirely from the Crow tribal fund, the appropriations from the fund being authorized by Congress. It seems apparent that whoever is responsible for the construction and maintenance of this project must have considered that the Crow tribal fund is inexhaustible, as money has been spent with a lavish hand, and seemingly with no thought as to whether the investment in irrigation works can ever be repaid by the lands included in the project. The most noticeable and regrettable feature of this project is the large number and great variety of unnecessarily complicated and excessively expensive concrete structures, many of which, in our judgment, are unnecessary, and only add to the difficulties and expense of operating and maintaining the project. The cost of some of these structures, as given by the project engineer, is so appalling and amazing as to be almost unbelievable. In certain instances it is inconceivable even after making every possible allowance for complicated designs involving intricate and difficult form work, long haul of materials, high-priced labor, and unsatisfactory weather conditions, how so much money could have been spent on some of these canal structures. As indicating the excessive cost of some of these structures, attention might be called to those on the Lodge Grass Canals. The cost of several concrete drops that were examined on this canal, as given us by the project engineer, much to our surprise, is slightly over $1,100 each. Ordinarily such structures are built for $150 to $300 each.

In many instances, in our judgment, as on the Lodge Grass and other small canals, many massive concrete structures have been built where there is no need for them, particularly if the canals and laterals had been properly located and the work adapted to local topographic and geologic conditions.

In many instances, the design of concrete structures is unnecessarily complicated, involving much difficult and expensive form work. Simple and approved styles and types have, in many cases, been discarded for the complicated and unusual, regardless of cost. As an example, the ordinary foot plank has in some cases been displaced by the more artistic and much more expensive reinforced concrete archtype footbridge.

While most of the concrete work seems to be of good, or fair quality, yet in some instances, it is of very poor quality, and a few of the structures are rapidly disintegrating, apparently as the result of unsatisfactory aggregate. Several water users charge there has been criminally wasteful expenditure of funds in building many useless and unnecessary structures, such as drops, checks, and culverts, such as for example on Lodge Grass and Big Horn Canal, as well as on other canals. Both Indians and whites claim that work by the Government costs two to three times what it should, as men leave home about 8, drive 10 or 20 miles to work, and always quit work to get back home before 5 p. m.

Irrigable acreage under constructed works.—Here, as on many other reservations, it is complained, and in fact it is quite apparent to your advisors, that the irrigable acreage now reported is considerably above the acreage that is in reality actually irrigable. In some cases, land that is nonirrigable because of its unsuitable topography, or other adverse conditions is now classed as irrigable, and in many instances, land for which there is not an adequate water supply is classed as irrigable.

It is frequently apparent that the irrigable acreage is purposely exaggerated in order to justify increased appropriations for carrying on the work. Some day there will have to be an accounting, and then it will be found that the area actually irrigable is much less than has been reported, and the irrigation costs will be correspondingly greatly increased. As an instance of this, it was complained to your advisors that the area now reported as irrigable on the Pryor Creek-Lost Creek unit of the Crow Reservation is twice or three times the area that can ever be irrigated, because of the gravelly land that requires excessive quantities of water.

Excessive operation and maintenance cost.—The construction cost of the project to June 30, 1927, was approximately two million dollars ($1,978,934.99). As compared with this it will be noted that the operation and maintenance cost to date is unusually high, being $1,011,284.58.

The irrigable area now under constructed works as reported is 56,163 acres. It is known, however, that this acreage will be materially reduced by an irrigable area, and a soil survey and classification. Assuming an acreage of 50,000 actually irrigable, the average acre construction cost for the entire project as of June 30, 1927, would be approximately $40. The operation and maintenance cost to

the same date would be approximately $20 per acre; or a total irrigation cost to date of $60 an acre.

It is noted that the operation and maintenance costs for this project, considering its area, have in some years been excessive. As an instance, in 1923 the operation and maintenance cost, with 30,011 acres reported as irrigated, was $102,114.60, or about $3.33 per acre for the acreage irrigated, or nearly $2 an acre for the acreage under constructed works.

Some complaint has been made that in an effort to keep down the construction costs so that they may not seem scandalously excessive, the general practice on this project has been to charge a part of the actual construction cost to operation and maintenance, so as to improve the appearance of the accounts. The operation and maintenance costs as reported for some years would seem to bear out this complaint, and it is believed that there should be a thorough investigation of this matter, including an audit of the accounts.

On this project, as on many other of our northern projects, particularly in Montana and Wyoming, ditch riders are carried on the pay roll for the entire year, although the irrigation season during which they are required to ride ditch is less than half the year. This matter has been the subject of bitter complaint by the farmers of this project—both Indian and white—for many years. The Indians particularly complained very bitterly against the expenditure of their tribal money for paying salaries to so-called ditch riders, who, as they state, "can only sit by the fire and smoke a pipe" for several months during the winter. It is the judgment of your advisors that this is a matter that should have been adjusted long ago. There can be no justification in reason for the employment of men as ditch riders where the irrigation is so short, as on this project. On projects considerably further south and with a correspondingly longer season than here, ditch riders are employed only during the season. The same practice should have been adopted here long ago, as it would have meant a saving of several thousand dollars each year.

Irrigation on Flathead Indian Reservation, Mont.

1. RECOMMENDATIONS

It is recommended:

1. That as a basis upon which to work out the problems of this project there should be an accurate and definite determination of the productive irrigable lands that are to be included in the project, such determination to be based on the results of a careful soil survey and classification; a thorough study of the productivity and water requirements of the various soil types; an investigation and study of the economic necessity and feasibility of irrigation for some lands as opposed to dry farming; an exhaustive investigation and determination of the available water supply; and a comprehensive report with estimated cost of completing the project, including necessary storage, drainage, additional canals and laterals, and all other necessary features.

2. That the soil survey and classification recommended in the foregoing be made by a skilled and experienced soil expert of the Department of Agriculture.

3. That the engineering investigations and studies to determine the economic feasibility of completing the project be made by a thoroughly well qualified and experienced irrigation engineer who heretofore has not in any way been connected with the project.

4. That the investigations and studies suggested in the preceding recommendations be made under the general direction of a board of not less than three consulting engineers of wide experience in irrigation work, who shall finally review all the data and prepare a report with recommendations and estimated cost of completing the project.

5. That pending the completion of the investigations and the report provided for in the foregoing recommendations, all construction work, extensions, and permanent improvement work be suspended.

6. That the gravelly and other lands requiring excessive quantities of water should be eliminated from the project and the water applied to the better lands where a higher efficiency can be secured.

7. That with an average crop return of less than $20 per acre, pumping for the irrigation of any part of the project is not economically feasible under present conditions.

8. That the project area should be reduced to the acreage that can safely be served from the water supply available without pumping, at least until such time as the project yields much higher crop returns than at present.

9. That with pumping eliminated for the present, no consideration should at this time be given to the construction of an electric transmission system financed with Government money to serve the water users electric power, as the present widely scattered population, and the small power market will not justify such an expenditure.

10. That the bureau adopt a strict policy of collecting both construction and operation and maintenance charges, and that the latter be collected in advance.

11. That the provision in the public notice providing for the refusal to deliver water where the water user is a year or more delinquent on construction charges be strictly complied with, and that all operation and maintenance public notices carry the same provision.

12. That in all cases where necessary suit be instituted for the collection of delinquent charges that can not otherwise be collected.

13. That the operation and maintenance charges of the project be placed upon a payment in advance basis for the minimum charge, which, with the charges for excess water, should be sufficient to cover the annual operation and maintenance costs.

14. That construction collections be made upon the basis of 2½ per cent of the construction costs to date as now determined from the area under constructed canals until such time as a soil survey and land classification shall establish a more accurate basis, provided the annual charge shall not exceed $1.50 per acre on all except the Camas unit, which shall not exceed $1 per acre.

15. That Indian allotments of not to exceed 40 acres farmed by the Indian shall not be assessed the minimum operation and maintenance charge; that the water ordinarily furnished for the minimum charge be delivered to these allotments, but payment be required for any excess amount at the established rates.

16. That the construction charges against all trust patented Indian lands be held as a lien against such lands, but shall not be accrued except as covered in recommendation No. 13; provided that when the land passes to fee patent the construction charges shall be paid in the manner then provided for private holdings and at the same rates, the first payment becoming due the first due date for other construction payments after fee patent issues.

17. That all leased Indian lands shall pay (*a*) the operation and maintenance charges annually in advance, and (*b*) 50 per cent of the cash or crop rental received to apply on the construction charges against said land, provided this may be waived by order of the Secretary of the Interior if the owner be an Indian not physically able to farm the land and having no other source of support; provided further, that any credits on construction thus made shall apply to the last payments or installments that will become due.

18. That all negotiations concerning the signing and ratification of the pending contract between the Government and the irrigation districts be suspended until a soil survey and classification of lands is made and there is an accurate and definite determination of the acreage to be included in the project, in order that all interested parties may be advised as to the acreage that will be obligated to return the construction cost, and the probable amount of such cost per acre.

2. SYNOPSIS

The Flathead Indian Reservation in western Montana was established in 1855 in pursuance of a treaty with the Flathead or Salish Tribe of Indians, which tribe originally occupied a large part of western Montana. Prior to this treaty and the establishment of the reservation, the Indians lived principally in the Bitter Root Valley. They moved to the Jocko River Valley in 1871. A mission was established at St. Ignatius by the Jesuit Fathers in 1854. The area of the reservation as originally established was approximately 1,193,000 acres. The area at the present time is given as 817,834 acres.

Transportation and markets.—The Northern Pacific Railroad traverses the southern part of the reservation and there is a branch line from Dixon, near the south central part of the reservation, to Polson, which is situated at the south end of Flathead Lake. The principal towns of the reservation are Polson (population 1,500), Ronan (600), St. Ignatius (400), Hot Springs (300).

Allotments.—It is reported that 2,082 allotments aggregating 227,282 acres are now held under trust patents and that the owners of 498 of these allotments are now deceased. It is stated that 860 fee patents have been issued and that 500 Indians are now without land, having received fee patents and sold their allotments. Six hundred and fourteen so-called deceased Indian allotments,

aggregating about 52,000 acres, have been sold at an average of about $22 per acre or approximately $1,150,000.

Population and Indian health.—It is reported that the Indian population in 1910 was 2,265 and in 1927, 2,745. There are 518 full bloods. It is reported there are 137 cases of tuberculosis and 378 cases of trachoma.

Climate.—Range in altitude of irrigable area 2,500 to 3,300 feet. Range in temperature −30° to 100°. Average annual precipitation 16.27 inches. Average growing season May 1 to October 1 or 150 days.

Topography, soil, and drainage.—A topographic survey of about 200,000 acres, including all project lands and some additional outside areas, was made by the Reclamation Service as a part of the preliminary surveys of the project. The average slope of the irrigable area is approximately 50 feet per mile. The irrigable area is to a considerable extent broken by ridges and coulees, very little of the land having a uniform slope. A soil survey was made of the Camas division in 1925. The soils are silt loam and sandy loam with a subsoil of clay, gravel, and sand. The duty of water ranges from 1½ to 3 acre-feet except on the Jocko division where, because of a porous gravel subsoil, the water requirement is considerably greater. Practically no drainage work has been done.

Cost of preparing land for irrigation.—This ranges from $10 to $50 per acre, being about $30 per acre for the average land.

Water supply and water rights.—For the season of 1926, 60,620 acre-feet of water was diverted for the irrigation of 33,946 acres. The water supply for the project is taken principally from the Little Bitter Root River, Jocko River, Flathead River, and the Mission, Post, Crow, and Finley Creeks.

General plan.—The present plans contemplate the ultimate irrigation of approximately 124,500 acres. It is reported that 60 per cent of this area is allotted to Indians and that 4 per cent of it is State land, the balance being homestead land. The project consists of three units, namely, the Jocko, Camas, and Mission Valley, as follows:

The Jocko unit consists of 13,500 acres in the Jocko Valley; 1,334 acres have a paid-up water right. Construction commenced in 1909. About 1,000 acres is on lower Jocko River and near Dixon receiving some water from Revais Creek. Lands on the south side of Jocko River near Arlee have insufficient water during latter part of season. Much of the lands along the Jocko River are gravelly, requiring a large amount of water. The canals lose heavily by seepage. It is considered necessary to concrete line them. Wooden structures built in 1909 are in need of renewing. The lands irrigated from Revais Creek are in need of supplemental supply by pumping. In 1907 arrangements were made with the Bureau of Reclamation to do the engineering and construction. Preliminary work commenced in July, 1908. It was originally considered that the project consisted of 152,000 acres. There are a number of small ditches which had been constructed by the Indians and whites prior to the beginning of the project. These rights were respected and protected. Allotments of Indian lands commenced in 1907. The allotments consisted of 80 acres of irrigable or 160 acres of dry land. The cost of the unit to date is $219,897.75; estimated to complete $300,000 or approximately $43 per acre.

The Camas unit is in the western part of the reservation. It receives water from Little Bitter Root River. The area of this unit is about 11,000 acres. Ninety-five per cent of the land was homesteaded in 1910. Construction commenced in 1916. The Little Bitter Root Lake Reservoir, at the head of the river, was constructed in 1916. Hubbard Reservoir was constructed in 1922 and 1923, with a capacity of 12,000 acre-feet. Dry Fork Reservoir was constructed in 1920, with a capacity of 2,000 acre-feet. Camas A Canal was constructed in 1916 to 1918, but was not placed in good operating condition until 1921 and still needs improving. Lateral system was constructed in 1917 to 1919. Construction cost to date is $1,024,959.27; estimated to complete $77,000 or $100 per acre.

The Mission Valley unit embraces an area of 100,000 acres. The water supply is taken from streams rising in the Mission Range of mountains. It is planned to supplement by pumping from Flathead Lake and River. Studies indicate supplemental needed for 25,000 acres.

Tabor Feed Canal diverts from Middle and North Fork of Jocko River. Constructed 1922 to 1924. Tabor Reservoir was constructed in 1916 with a capacity of 12,500 acre-feet. Creek Lined Canal connects Tabor Reservoir with Pablo Feeder Canal. The latter canal begins at Dry Creek extending north along the foot of Mission Range for 45 miles to Pablo Reservoir with a capacity of 200 to

400 second-feet. It was constructed in 1910 to 1921. Mission Reservoir has a capacity of 6,000 acre-feet. McDonald Lake Reservoir has a capacity of 8,200 acre-feet, constructed 1916 to 1920. Kickinghorse Reservoir has an estimated capacity of 6,800 acre-feet. No construction work has been done. Ninepipe Reservoir has a capacity of 15,150 acre-feet constructed 1910 to 1923. Pablo Reservoir, with a present capacity of 13,000 acre-feet and a proposed capacity of 25,000 acre-feet, was constructed in 1912 to 1918. North Pablo Reservoir was abandoned because of leakage. Lower Crow reservoir site has an estimated capacity of 5,000 acre-feet. No work has been done on this reservoir. The cost of Mission unit reservoir system to date is $1,241,545.06.

Area and utilization.—Estimated area in project 124,500 acres; 112,000 acres can be served; irrigated 1926, 33,947 acres; in cultivated crops 27,219 acres; crop production $631,637 or $17.10 per acre; 116 Indians farming. Sixty-three thousand eight hundred and seventy-three acres dry farmed. The Indians farmed 462 acres of their irrigable area on which they produced $6,748. Lessees farmed 1,718 acres of Indian irrigated land on which were produced $31,178. The whites farmed 31,637 acres on which was produced $593,710.

Principal crops.—The principal crops grown are alfalfa hay, nearly 50 per cent of acreage; wheat, 12 per cent; oats, 5 per cent; with 16 per cent in pasture. Dry land farming consists mostly of grain farming. Summer fallowing is practiced and in this way very successful crops are grown. The yield on irrigated farms has been low due to lack of preparation. Little rotation of crops is practiced. No sugar beets have been grown up to the present time. Potato market has not been developed.

Economic conditions.—Estimated 120 Indian families farming, own $1,200 worth livestock per farm; $500 farm equipment; 12,000 acres farmed (mostly dry farming). The average income per family is $1,000. Two thousand five hundred and thirty-six Indians receive some income from tribal sources, leasing, etc. The average received is $50 per year.

Project operation and maintenance cost and collections.—The operating costs for 1927 were $22,274.17 and maintenance costs $47,639.95 or a total of $69,914.12. Operation and maintenance rate, minimum 40 cents per acre, varying per acre-foot charge depending on unit and time of use. Operation and maintenance costs to June 30, 1927, were $774,855.56, assessments $413,470.24, collections $315,055.59.

Project problems, defects, and complaints.—The rainfall is sufficient to mature grain on some parts of the project. Part of Mission unit is in marginal state; that is, irrigation is not a necessity. Production on irrigated lands, $20 per acre. With slight difference in production on irrigated and dry land, it is difficult to get farmers to use water. Dry farming methods with use of labor saving machinery enables cheaper production than 10 years ago. Estimate present duty of water 1 to 3 acre-feet per acre. Varies on different units. Certain lands take 7 acre-feet or more. Total irrigable acreage estimated at 124,500 acres. Indians own 30,127 acres or 24 per cent; balance owned by whites; 33,947 acres irrigated in 1926; 462 acres by Indians; 63,873 acres dry farmed. In 1913, 42,400 acres were under constructed works; 112,000 now under constructed works. Irrigated area increased from 4,579 acres in 1913 to 32,816 acres in 1919. Little increase since. Dry farming area increased from 46,333 acres in 1924 to 63,873 acres in 1926. Problem is to develop a more profitable form of irrigated agricultural production. Water supply insufficient without pumping.

All important structures are of permanent character; renewals should be charged to maintenance and not to capital investment. Lumber, when relatively cheap, should be used for unimportant structures rather than concrete. Some concrete structures are no more nearly permanent than wood. No justification at this time to replace the temporary structures with permanent ones until the project is in a better economic condition.

Considerable sentiment around Ronan against including certain lands in the irrigation system; 77 landowners representing 6,000 acres request that no ditches be constructed to those lands, as they claim they can grow good crops without irrigation. Engineering report of March 11, 1918, recommended these lands be excluded, giving reasons as lands rough and rolling, some sandy, difficult to irrigate; located in heaviest snow belt; have good production without irrigation. Limited water supply for project. No laterals built at that time. Lands can be included later if desired and other conditions are favorable; 12,000 acres remain to come under constructed works. The above board report placed limit of Mission Valley unit at 75,000 acres. There is no reason why the conclusions

of the board at that time should not now prevail. Opportunity for cheap power exists on Flathead River, or purchasing same from commercial companies, yet under present economic conditions pumping water for irrigation here is not justified.

The contract between the Government and Flathead Irrigation District providing for district obligation to repay Government has been approved as to form and is now in the hands of the district for execution. This contract provides for continuing construction. Camas unit is to pay the same as Mission unit; balance to be made up from profits in power. Under appropriation act of March 7, 1928, provision is made for leasing power site, rental to go to Indian tribal fund. Only profits would be from transmission lines. No profits likely from that source.

Camas unit costs to June 30, 1927, are $1,024,959.27, or $95 per acre; probable loss, $309,959, based on irrigable area of 11,000 acres. The Northern Pacific Railroad serves the Jocko and Mission units. Camas unit is 25 to 40 miles from shipping point. Classification of lands will reduce the acreage, increasing the loss.

Additional expenditures are contemplated; contract as drawn contemplates ultimate acreage of 124,500 acres, but no acreage is stated in the contract. The above acreage is common knowledge among water users and used by them in their discussions. Advisors believe there must be a considerable scaling down of acreage. The intention of the Government is not to spend more than $40 per acre on the Jocko unit and $65 per acre on the balance. Favorable vote by district entering contract would be influenced by present per acre cost and amounts still to be expended. Overestimate of acreage is reclamation project always leads to all sorts of trouble. To eliminate misunderstanding and in fairness to water users, acreage upon which construction is to be predicated should be known and placed before them. Present acreage is nothing more than a guess. No provision for drainage. Contract should provide $10 to $15 per acre for that purpose, if necessary.

Construction cost of project to June 30, 1927, $5,169,311.12; operation and maintenance, $774,855.56, or a total of $5,944,167.18. Total collections, $389,844.49, leaving a net investment of $5,554,322.69. Construction charges assessed since 1920 on irrigable area, except 1920 on irrigated acreage. Both Indian and white lands assessed. None collected from lessees. Operation and maintenance based on 111,000 acres; rates have varied. If project is to pay irrigation charges a more strenuous collection policy must be adopted. Construction collections, 50 cents per acre since 1920. Solicitor found no authority for collection of penalty. Nondelivery of water and bringing suit only way to make collection. Records and correspondence show no effort to enforce by nondelivery of water; and collections complicated by relief acts. Field service has taken instructions to mean that water may be delivered when construction is delinquent. Having delivered water to water users who are delinquent more than one year, the Government is in no moral position to enforce collections. Collection policy pursued differs from that stated to the Subcommittee on Appropriations. Delivery of water to delinquents of more than one year's standing constitutes an extension of time. Not surprising that so poor a showing has been made. Fifty cents per acre has been a very modest assessment. If it can not be paid project is a failure. There is no reason why these small yearly payments should not have been collected.

Operation and maintenance assessments since 1924, based upon irrigable area, costs in recent years more than accruals. Lack of appreciation on most projects that operation and maintenance charges, like taxes, if unpaid, continue to grow. Operation and maintenance costs tend to increase. Seventy-five per cent increase in seven years, while irrigated acreage increased 1,000 acres. Difficult to increase rates to care for deficit of previous years. Rates should be increased to produce some reserve as well as to care for the going cost. Irrigation laws recognize this principle. Strong incentive on part of management and water users to use large acreage in arriving at unit costs. Advisors feel that every doubtful acre should be eliminated. A soil survey and land classification are essential in working out every problem facing this project. Under the present system the Government carries cost of operation and maintenance until en of irrigation season. There is no reason why the project should not be put on a payment-in-advance basis.

3. DIGEST OF LEGISLATION, TREATIES, AND EXECUTIVE ORDERS

Act April 23, 1904 (33 Stat. 305): SEC. 14. That the proceeds received from the sale of said lands in conformity with this act shall be paid into the Treasury of the United States, and after deducting the expenses of the commission, of classification and sale of lands, and such other incidental expenses as shall have been necessarily incurred, and expenses of the survey of the lands, shall be expended or paid, as follows: One half shall be expended from time to time by the Secretary of the Interior as he may deem advisable for the benefit of the said Indians and such persons having tribal rights on the reservation, including the Lower Pend d'Oreille or Kalispel thereon at the time that this act shall take effect, in the construction of irrigation ditches, the purchase of stock cattle, farming implements, or other necessary articles to aid the Indians in farming and stock raising, and in the education and civilization of said Indians, and the remaining half to be paid to the said Indians and such persons having tribal rights on the reservation, including the Lower Pend d'Oreille or Kalispel thereon at the date of the proclamation provided for in section 9 hereof, or expended on their account, as they may elect.

Act June 21, 1906 (34 Stat. 354): That the act of April 23, 1904 (33 Stat. L. 302) entitled "An act for the survey and allotment of lands now embraced within the limits of the Flathead Indian Reservation, in the State of Montana, and the sale and disposal of all surplus lands after allotment," as amended by section 9 of the act of March 3, 1905 (33 Stat. L. 1048), be amended by adding the following section:

"SEC. 19. That nothing in this act shall be construed to deprive any of said Indians, or said persons or corporations to whom the use of land is granted by this act, of the use of water appropriated and used by them for the necessary irrigation of their lands or for domestic use or any ditches, dams, flumes, reservoirs constructed and used by them in the appropriation and use of said water."

Act April 30, 1908 (35 Stat. 83): For preliminary surveys, plans, and estimates of irrigating systems to irrigate the allotted lands of the Indians of the Flathead Reservation in Montana and the unallotted irrigable lands to be disposed of under the act of April 23, 1804, entitled "An act for the survey and allotment of lands now embraced within the limits of the Flathead Indian Reservation, in the State of Montana, and the sale and disposal of all surplus lands after allotment," and to begin the construction of the same, $50,000, the cost of said entire work to be reimbursed from the proceeds of the sale of the lands within said reservation.

Act May 29, 1908 (35 Stat. 448): SEC. 15. That section 9, chapter 495, Statutes of the United States of America, entitled "An act for the survey and allotment of lands now embraced within the limits of the Flathead Indian Reservation, in the State of Montana, and the sale and disposal of all surplus lands after allotment" be, and the same is hereby, amended to read as follows:

"SEC. 9. That said lands shall be opened to settlement and entry by proclamation of the President, which proclamation shall prescribe the time when and the manner in which these lands may be settled upon, occupied, and entered by persons entitled to make entry thereof, and no person shall be permitted to settle upon, occupy, or enter any of said lands except as prescribed in such proclamation: *Provided*, That the rights of honorable discharged Union soldiers and sailors of the late Civil and Spanish Wars as defined and prescribed in section 2304 and 2305 of the Revised Statutes, as amended by the act of March 1, 1901, shall not be abridged: *Provided further*, That the price of said lands shall be the appraised value thereof, as fixed by the said commission, but settlers under the homestead law who shall reside upon and cultivate the land entered in good faith for the period required by existing law shall pay one-third of the appraised value in cash at the time of entry and the remainder in five equal annual installments, to be paid one, two, three, four, and five years, respectively, from and after the date of entry, and shall be entitled to a patent for the lands so entered upon the payment to the local land officers of said five annual payments, and in addition thereto the same fees and commissions at the time of commutation or final entry as now provided by law where the price of the land is $1.25 per acre, and no other and further charge of any kind whatsoever shall be required of such settler to entitle him to a patent for the land covered by his entry: *Provided*, That if any entryman fails to make such payments, or any of them, within the time stated, all rights in and to the land covered by his or her entry shall at once cease, and any payments theretofore made shall be forfeited, and the entry shall be forfeited and canceled: *And provided*, That nothing in this act shall prevent homestead settlers from commuting their entries under section 2301, Revised

Statutes, by paying for the land entered the price fixed by said commission, receiving credit for payments previously made: *Provided, however,* That the entryman or owner of any land irrigable by any system hereunder constructed under the provisions of section 14 of this act shall in addition to the payment required by section 9 of said act be required to pay for a water right the proportionate cost of the construction of said system in not more than 15 annual installments, as fixed by the Secretary of the Interior, the same to be paid at the local land office, and the register and receiver shall be allowed the usual commissions on all moneys paid.

"The entrymen of lands to be irrigated by said system shall in addition to compliance with the homestead laws reclaim at least one-half of the total irrigable area of his entry for agricultural purposes, and before receiving patent for the lands covered by his entry shall pay the charges apportioned against such tract. No right to the use of water shall be disposed of for a tract exceeding 160 acres to any one person, and the Secretary of the Interior may limit the areas to be entered at not less than 40 nor more than 160 acres each.

"A failure to make any two payments when due shall render the entry and water-right application subject to cancellation, with the forfeiture of all rights under this act, as well as of any moneys paid thereon. The funds arising hereunder shall be paid into the Treasury of the United States and be added to the proceeds derived from the sale of the lands. No right to the use of water for lands in private ownership shall be sold to any landowner unless he be an actual bona fide resident on such land or occupant thereof residing in the neighborhood of such land, and no such right shall permanently attach until all payments therefor are made.

"All applicants for water rights under the systems constructed in pursuance of this act shall be required to pay such annual charges for operation and maintenance as shall be fixed by the Secretary of the Interior, and failure to pay such charges when due shall render the water-right application and the entry subject to cancellation, with the forfeiture of all rights under this act as well as of any moneys already paid thereon.

"The Secretary of the Interior is hereby authorized to fix the time for the beginning of such payments and to provide such rules and regulations in regard thereto as he may deem proper. Upon the cancellation of any entry or water-right application, as herein provided, such lands or water rights may be disposed of under the terms of this act and at such price and upon such conditions as the Secretary of the Interior may determine, but not less than the cost originally fixed.

"The land irrigable under the systems herein provided, which has been allotted to Indians in severalty, shall be deemed to have a right to so much water as may be required to irrigate such lands without cost to the Indians for construction of such irrigation systems. The purchaser of any Indian allotment, purchased prior to the expiration of the trust period thereon, shall be exempt from any and all charge for construction of the irrigation system incurred up to the time of such purchase. All lands allotted to Indians shall bear their pro rata share of the cost of the operation and maintenance of the system under which they lie.

"When the payments required by this act have been made for the major part of the unallotted lands irrigable under any system and subject to charges for construction thereof, the management and operation of such irrigation works shall pass to the owners of the lands irrigated thereby, to be maintained at their expense under such form of organization and under such rules and regulations as may be acceptable to the Secretary of the Interior.

"The Secretary of the Interior is hereby authorized to perform any and all acts and to make such rules and regulations as may be necessary and proper for the purpose of carrying the provisions of this act into full force and effect."

That section 14 of said act be, and the same is hereby amended to read as follows:

"SEC. 14. That the proceeds received from the sale of said lands in conformity with this act shall be paid into the Treasury of the United States, and after deducting the expenses of the commission, of classification and sale of lands, and such other incidental expenses as shall have been necessarily incurred, and expenses of the survey of the land, shall be expended or paid, as follows: So much thereof as the Secretary of the Interior may deem advisable in the construction of irrigation systems, for the irrigation of the irrigable lands embraced within the limits of said reservation; one-half of the money remaining after the construction of said irrigation systems to be expended by the Secretary of the Interior as he may deem advisable for the benefit of such Indians in the purchase of livestock,

farming implements, or the necessary articles to aid such Indians in farming and stock raising and in the education and civilization of said Indians, and the remaining half of said money to be paid to said Indians and persons holding tribal rights on said reservations, semiannually as the same shall become available share and share alike: *Provided*, That the Secretary of the Interior may withhold from any Indian a sufficient amount of his pro rata share to pay any charge assessed against land held in trust for him for operation and maintenance of irrigation systems."

Act March 3, 1909 (35 Stat. 795): For construction of irrigation systems to irrigate the allotted lands of the Indians of the Flathead Reservation in Montana and the unallotted irrigable lands to be disposed of under the act of April 23, 1904, entitled "An act for the survey and allotment of lands now embraced within the limits of the Flathead Indian Reservation, in the State of Montana, and the sale and disposal of all surplus lands after allotment," including the necessary syrveys, plans, and estimates, $250,000, $100,000 thereof to be immediately available, the cost of said entire work to be reimbursed from the proceeds of the sale of the lands and timber within said reservation.

That the act of April 23, 1904 (33 Stat. L., p. 302), entitled "An act for the survey and allotment of lands now embraced within the limits of the Flathead Indian Reservation, in the State of Montana, and the sale and disposal of all surplus lands after allotment," as amended by the act of June 21, 1906, and the act of May 29, 1908, be amended by adding thereto the following sections.

* * * * * * *

"SEC. 22. That the Secretary of the Interior be, and he is hereby, authorized, in his discretion, to reserve from location, entry, sale, or other appropriation all lands within said Flathead Indian Reservation chiefly valuable for power sites or reservoir sites, and he shall report to Congress such reservations."

Act April 4, 1910 (36 Stat. 277): For the construction of irrigation systems to irrigate the allotted lands of the Indians of the Flathead Reservation, in Montana, and the unallotted irrigable lands to be disposed of under authority of law, including the necessary surveys, plans, and estimates, $250,000, $100,000 of which shall be immediately available: *Provided*, That the amount hereby appropriated and all moneys heretofore or hereafter to be appropriated for this project shall be repaid into the Treasury of the United States in accordance with the provisions of the act of April 30, 1908, and the act of March 3, 1909.

Act April 12, 1910 (36 Stat. 296): An act to amend the act of April 23, 1904 (33 Stat. L. 302), entitled "An act for the survey and allotment of lands now embraced within the limits of the Flathead Indian Reservation, in the State of Montana, and the sale and disposal of all surplus lands after allotment," and all amendments thereto.

SEC. 24. That where allotments of land have been made in severalty to said Indians from the lands embraced within the area of said Flathead Indian Reservation, which are or may be irrigable lands, the Secretary of the Interior may, upon application of the Indian allottee, sell and dispose of not to exceed 60 acres of such individual allotment of land under such terms and conditions of sale as the Secretary of the Interior may prescribe, one half of the proceeds of the sale of said individual allotment to be paid to the Indian allottee and the remaining half of the proceeds of sale to be held in trust for the said Indian allottee, upon which he shall be paid annually not less than 3 per cent interest, the remaining principal sum to be paid to said allottee or his heirs when the full period of his trust patent for the remaining lands covered by his allotment shall have expired, or sooner, should the Secretary of the Interior, in his judgment, deem it best for said Indian allottee.

SEC. 25. That the Secretary of the Interior is hereby authorized to set aside and reserve so much of the surplus unallotted and otherwise unreserved lands of the Flathead Indian Reservation as may be necessary to provide an allotment to each Indian having an allotment on any of the lands set aside and reserved for power or reservoir sites, as authorized by section 22 of the act of March 3 1909 (35 Stat. L., 796), who may relinquish his allotment within such power or reservoir sites.

And in the event of the failure, neglect, or refusal of any such allottee to relinquish any allotment made to him on any land reserved or necessary for reservoir sites, as aforesaid, the Secretary of the Interior is authorized to bring action under the provision of the laws of the State of Montana to condemn and acquire title to any and all lands necessary or useful for said reservoir sites that have heretofore been allotted on said Flathead Indian Reservation lands.

Act March 3, 1911 (36 Stat. 1056): For the construction of irrigation systems to irrigate the allotted lands of the Indians of the Flathead Reservation in Montana, and the unallotted irrigable lands to be disposed of under authority of law, including the necessary surveys, plans, and estimates, $409,000.

* * * * * * *

In the issuance of patents for all tracts of land bordering upon Flathead Lake, Montana, it shall be incorporated in the patent that "This conveyance is subject to an easement of 100 linear feet back from a contour of elevation 9 feet above the high-water mark of the year 1909 of Flathead Lake, to remain in the Government the purposes connected with the development of water power."

Act of August 24, 1912 (37 Stat. 526): For continuing the construction of irrigation systems to irrigate the allotted lands of the Indians of the Flathead Reservation, in Montana, and the unallotted irrigable lands to be disposed of under authority of law, including the necessary surveys, plans, and estimates, $209,000, reimbursable in accordance with the provisions of the act of April 4, 1910.

* * * * * * *

That so much of the act of Congress approved March 3, 1911 (36 Stat L. 1066), which provides for the reservation of an easement over tracts of land bordering Flathead Lake, Montana, be, and the same hereby is, amended to read as follows: "That an easement in, to, and over all lands bordering on or adjacent to Flathead Lake, Mont., which lie below an elevation of 9 feet above the high-water mark of said lake for the year 1909, is hereby reserved for uses and purposes connected with storage for irrigation or development of water power, and all patents hereafter issued for any such lands shall recite such reservation.

Act June 30, 1913 (38 Stat. 90): For continuing the construction of irrigation systems to irrigate the allotted lands of the Indians of the Flathead Reservation, in Montana, and the unallotted irrigable lands to be or which have been heretofore disposed of under authority of law, including the necessary surveys, plans and estimates, $325,000, to be immediately available, reimbursable in accordance with the provisions of the act of April 4, 1910.

Act July 17, 1914 (38 Stat. 510): * * * That the provisions of the act of June 23, 1910 (36 Stat. L. 592), authorizing the assignment under certain conditions of homesteads within reclamation projects, and of the act of August 9, 1912 (37 Stat. L. 265) authorizing under certain conditions the issuance of patents on reclamation entries, and for other purposes, be, and the same are hereby, extended and made applicable to lands within the Flathead irrigation project, in the former Flathead Indian Reservation, Mont., but such lands shall otherwise be subject to the provisions of the act of Congress approved April 23, 1904 (33 Stat. L. 302), as amended by the act of Congress approved May 29, 1908 (35 Stat. L. 48): *Provided*, That the lien reserved to the United States on the land patented, as provided for in section 2 of said act of August 9 1912, shall include all sums due or to become due to the United States on account of the Indian price of such land.

Act August 1, 1914 (38 Stat. 593): For continuing the construction of irrigation systems to irrigate the allotted lands of the Indians of the Flathead Reservation, in Montana, and the unallotted irrigable lands to be or which have been heretofore disposed of under authority of law, including the necessary surveys, plans, and estimates, $200.000, reimbursable in accordance with the provisions of the act of April 4, 1910, and to remain available until expended.

Joint resolution March 4, 1915 (38 Stat. 1228) reenacted the item of August 1, 1914, for the fiscal year 1916.

Act May 18, 1916 (39 Stat. 139): For continuing construction of the irrigation systems on the Flathead Indian Reservation, in Montana, $750,000 (reimbursable), which shall be immediately available and remain available until expended: *Provided*, That the payments for the proportionate cost of the construction of said systems required of settlers on the surplus unallotted land by section 9, chapter 495, Statutes of the United States of America, entitled "An act for the survey and allotment of lands now embraced within the limits of the Flathead Indian Reservation, in the State of Montana, and the sale and disposal of all surplus lands after allotment," as amended by section 15 of the act of May 29, 1908 (35 Stat. L. 448), shall be made as herein provided: *Provided further*, That nothing contained in the act of May 29, 1908 (35 Stat. L. 444), shall be construed to exempt the purchaser of any Indian allotment purchased prior to the expiration of the trust period thereon from any charge for construction of the irrigation system incurred up to the time of such purchase, except such charges as shall have accrued and become due in accordance with the public

notices herein provided for, or to relieve the owners of any or all land allotted to Indians in severalty from payment of the charges herein required to be made against said land on account of construction of the irrigation systems; and in carrying out the provisions of said section the exemption therein authorized from charges incurred against allotments purchased prior to the expiration of the trust period thereon shall be the amount of the charges or installments thereof due under public notice herein provided for up to the time of such purchase.

Act May 18, 1916 (39 Stat. 141): * * * The work to be done with the amounts herein appropriated for the completion of the Blackfeet, Flathead, and Fort Peck projects may be done by the Reclamation Service on plans and estimates furnished by that service and approved by the Commissioner of Indian Affairs: *Provided*, That not to exceed $15,000 of applicable appropriations made for the Flathead, Blackfeet, and Fort Peck irrigation projects shall be available for the maintenance, repair, and operation of motor-propelled and horse-drawn passenger-carrying vehicles for official use upon the aforesaid irrigation projects: *Provided further*, That not to exceed $7,500 may be used for the purchase of horse-drawn passenger-carrying vehicles, and that not to exceed $1,500 may be used for the purchase of motor-propelled passenger-carrying vehicles. That the Secretary of the Interior be, and he is hereby, authorized and directed to announce at such time as in his opinion seems proper the charge for construction of irrigation systems on the Blackfeet, Flathead, and Fort Peck Indian Reservations in Montana which shall be made against each acre of land irrigable by the systems on each of said reservations. Such charges shall be assessed against the land irrigable by the systems on each said reservation in the proportion of the total construction cost which each acre of such land bears to the whole area of irrigable land thereunder.

On the first day of December after the announcement by the Secretary of the Interior of the construction charge the allottee, entryman, purchaser, or owner of such irrigable land which might have been furnished water for irrigation during the whole of the preceding irrigation season from ditches actually constructed shall pay to the superintendent of the reservation where the land is located for deposit to the credit of the United States as a reimbursement of the appropriations made or to be made for construction of said irrigation systems 5 per cent of the construction charge fixed for his land as an initial installment, and shall pay the balance of the charge in 15 annual installments, the first five of which shall each be 5 per cent of the construction charge and the remainder shall each be 7 per cent of the construction charge. The first of the annual installments shall become due and payable on December 1 of the fifth calendar year after the initial installment: *Provided*, That any allottee, entryman, purchaser, or owner may, if he so elects, pay the whole or any part of the construction charges within any shorter period: *Provided further*, That the Secretary of the Interior may, in his discretion, grant such extension of the time for payments herein required from Indian allottees or their heirs as he may determine proper and necessary so long as such land remains in Indian title.

That the tribal funds heretofore covered into the Treasury of the United States in partial reimbursement of appropriations made for constructing irrigation systems on said reservations shall be placed to the credit of the tribe and be available for such expenditure for the benefit of the tribe as Congress may hereafter direct.

The cost of constructing the irrigation systems to irrigate allotted lands of the Indians on these reservations shall be reimbursed to the United States as hereinbefore provided, and no further reimbursements from the tribal funds shall be made on account of said irrigation works except that all charge against Indian allottees or their heirs herein authorized, unless otherwise paid, may be paid from the individual shares in the tribal funds, when the same is available for distribution, in the discretion of the Secretary of the Interior.

That in addition to the construction charges every allottee, entryman, purchaser, or owner shall pay to the superintendent of the reservation a maintenance and operation charge based upon the total cost of maintenance and operation of the systems on the several reservations, and the Secretary of the Interior is hereby authorized to fix such maintenance and operation charge upon such basis as shall be equitable to the owners of the irrigable land. Such charges when collected shall be available for expenditure in the maintenance and operation of the systems on the reservation where collected: *Provided*, That delivery of water to any tract of land may be refused on account of nonpayment of any charges herein authorized, and the same may, in the discretion of the Secretary of the Interior, be collected by a suit for money owed: *Provided further*, That

the rights of the United States heretofore acquired to water for Indian lands referred to in the foregoing provision, namely, the Blackfeet, Fort Peck, and Flathead Reservation land, shall be continued in full force and effect until the Indian title to such land is extinguished.

That the Secretary of the Interior be, and he is hereby, authorized to prescribe such rules and regulations and issue such notices as may be necessary to carry into effect the provisions of this act, and he is hereby authorized and directed to determine the area of land on each reservation which may be irrigated from constructed ditches and to determine what allowance, if any, shall be made for ditches constructed by individuals for the diversion and distribution of a partial or total water supply for allotted or surplus unallotted land: *Provided*, That if water be available prior to the announcement of the charge herein authorized, the Secretary of the Interior may furnish water to land under the systems on the said reservation, making a reasonable charge therefor, and such charges when collected may be used for construction or maintenance of the systems through which such water shall have been furnished.

Act March 2, 1917 (39 Stat. 980): For continuing construction of the irrigation systems on the Flathead Indian Reservation in Montana, $750,000 (reimbursable), which shall be immediately available and remain available until expended * * *.

Act May 25, 1918 (40 Stat. 574): For continuing construction, maintenance, and operation of the irrigation systems on the Flathead Indian Reservation, in Montana, $375,000 (reimbursable), which shall be immediately available and remain available until expended * * *.

Act June 30, 1919 (41 Stat. 16): For continuing construction, maintenance, and operation of the irrigation systems on the Flathead Indian Reservation, in Montana, $375,000 (reimbursable), to remain available until expended * * *.

Act February 14, 1920 (41 Stat. 408): For continuing construction, maintenance, and operation of the irrigation systems on the Flathead Indian Reservation, in Montana, $200,000 (reimbursable), to remain available until expended.

Act March 3, 1921 (41 Stat. 1225): For continuing construction, maintenance, and operation of the irrigation systems on the Flathead Indian Reservation, in Montana, $200,000 (reimbursable), to be immediately available and to remain available until expended.

Act May 24, 1922 (42 Stat. 559–580): For continuing construction, maintenance, and operation of the irrigation systems on the Flathead Indian Reservation, in Montana, $200,000 (reimbursable), to be immediately available.

Act January 24, 1923 (42 Stat. 1174): For continuing construction, maintenance, and operation of the irrigation systems on the Flathead Indian Reservation, in Montana, including the purchase of any necessary rights of property, $555,000 (reimbursable), to be immediately available.

Act June 5, 1924 (43 Stat. 390): For continuing construction, maintenance, and operation of the irrigation systems on the Flathead Indian Reservation, in Montana, by and under the direction of the Commissioner of Indian Affairs, including the purchase of any necessary rights or property, $150,000 (reimbursable).

Act March 3, 1925 (43 Stat. 1146): For continuing construction, maintenance, and operation of the irrigation systems on the Flathead Indian Reservation, in Montana, by and under the direction of the Commissioner of Indian Affairs, including the purchase of any necessary rights or property, $35,000, of which $10,000 shall be available only for the completion of the Taber feed canal (reimbursable).

Act May 10, 1926 (44 Stat. 458): For continuing construction, maintenance, and operation of the irrigation systems on the Flathead Indian Reservation, in Montana, by and under the direction of the Commissioner of Indian Affairs, including the purchase of any necessary rights or property, $575,000: *Provided*, That of the total amount herein appropriaed not to exceed $15,000 shall be available for operation and maintenance of the project, the balance to be available for the construction items hereinafter enumerated in not to exceed the following amounts: Pablo feed canal enlargement, $100,000; Moiese canal enlargement, $15,000; South Side Jocko canal, $40,000; Hubbart feed canal, $7,500; Camas A canal, $2,500; continuing construction of power plant, $395,000, of which sum $15,000 shall be immediately available for additional surveys and preparation of plans: *Provided further*, That no part of this appropriation, except the $15,000 herein made immediately available, shall be expended on construction work until an appropriate repayment contract, in form approved by the Secretary of the Interior, shall have been properly executed by a district or districts organized

under State law embracing the lands irrigable under the project, except trust patent Indian lands, which contract, among other things, shall require repayment of all construction costs heretofore or hereafter incurred on behalf of such lands, with provision that the total construction cost on the Camas division in excess of the amount it would be if based on the per acre construction cost of the Mission Valley Division of the project, shall be held and treated as a deferred obligation to be liquidated as hereinafter provided. Such contract shall require that the net revenue derived from the operation of the power plant herein appropriated for shall be used to reimburse the United States in the following order: First, to liquidate the cost of the power development; second, to liquidate payment of the deferred obligation on the Camas Division; third, to liquidate construction cost on an equal per acre basis on each acre of irrigable land within the entire project; and fourth, to liquidate operation and maintenance costs within the entire project.

Provision shall also be contained therein requiring payment of operation and maintenance charges annually in advance of each irrigation season and prohibit the granting of a water right to or the use of water by any individual for more than 160 acres of land irrigable under constructed works within the project after the Secretary of the Interior shall have issued public notice in accordance with the act of May 18, 1916 (39 Stat. L. 123–130); all lands, except lands owned by individual Indians, at the date of public notice in excess of 160 acres not disposed of by bona fide sale within two years after said public notice shall be conveyed in fee to the United States free of encumbrance to again become a part of the public domain under contract between the United States and the individual owners at the appraised price fixed at the instance of the Secretary of the Interior, such amount to be credited in reduction of the construction charge against the land within the project retained by such owner. All lands so conveyed to the United States shall be subject to disposition by the Secretary of the Interior in farm units at the appraised price, to which shall be added such amount as may be necessary to cover any accruals against the land and other costs arising from conditions and requirements prescribed by said Secretary: *Provided further*, That trust patent Indian lands shall not be subject to the provisions of the law of any district created as herein provided for, but shall, upon the issuance of fee patent therefor, be accorded the same rights and privileges and be subject to the same obligations as other lands within such district or districts: *Provided further*, That all construction, operation, and maintenance costs, except such construction costs on the Camas Division held and treated as a deferred obligation herein provided for, on this project shall be, and are hereby, made a first lien against all lands within the project, which lien upon any particular farm unit shall be released by the Secretary of the Interior after the total amount charged against such unit shall have been paid, and a recital of such lien shall be made in any instrument issued prior to such release by the said Secretary. The contracts executed by such district or districts shall recognize and acknowledge the existence of such lien: *Provided further*, That pending the issuance of public notice the construction assessment shall be at the same rate heretofore fixed by the Secretary of the Interior, but upon issuance of public notice the assessment rate shall be 2½ per cent per acre, payable annually, in addition to the net revenues derived from operations of the power plant, as hereinbefore provided, of the total unpaid construction costs at the date of said public notice: *Provided further*, That the public notice above referred to shall be issued by the Secretary of the Interior upon completion of the construction of the power plant.

Act January 12, 1927 (44 Stat. 934): Flathead irrigation project, Montana: For operation and maintenance, $25,000, to be immediately available: *Provided*, That of the unexpended balance of the appropriation for this project for the fiscal year 1927 there is hereby reappropriated and made available for the fiscal years 1927 and 1928, $40,000, for construction of the South Side Jocko canal, available when the Jocko irrigation district shall properly execute an appropriate repayment contract, in form approved by the Secretary of the Interior, which contract shall, except as hereinafter provided, conform to the conditions provided for a contract in the appropriation for this project for the fiscal year 1927: *Provided further*, That of said unexpended balance there is hereby reappropriated and made available for the fiscal years 1927 and 1928 not to exceed the following amounts: Pablo feed canal enlargement, $100,000; Moiese canal enlargement, $15,000; Hubbart feed canal, $7,500; Camas A canal, $2,500, available when the Flathead irrigation district shall properly execute an appropriate repayment contract, in form approved by the Secretary of the Interior, which contract shall, except as hereinafter provided, conform to the conditions provided for a contract

in the appropriation for this project for the fiscal year 1927: *And provided further*, That the remainder of the unexpended balance of the appropriation for this project for the fiscal year 1927 shall at once become available, and remain available for the fiscal years 1927 and 1928, for continuing construction of power plant when an appropriate repayment contract, in form approved by the Secretary of the Interior, and which, except as hereinafter provided, contains the provisions set forth for such a contract in the appropriation for this project for the fiscal year 1927, shall have been executed by a district or districts organized under State law embracing not less than 80,000 acres of the lands irrigable under the project: *And provided further*, Any contract provided for in this paragraph shall require that the net revenues derived from operation of the power plant shall be used to reimburse the United States in the following order: First, to liquidate the cost of the power development; second, to liquidate payment of the deferred obligation on the Camas division; third, to liquidate construction cost on the equal per acre basis on each acre of irrigable land within the district or districts contracting; and fourth, to liquidate operation and maintenance costs within such district or districts.

4. HISTORY

The Flathead or Selish Tribes of Indians occupied parts of Montana west of the Rocky Mountains before settlement by whites. The Kootenai Indians also occupied the northern part of this territory. The headquarters of the Flathead Tribes was in the Bitterroot Valley until 1871. By the treaty of 1855 the tribes agreed to allow the Government to survey and decide as to what part of this territory should be reserved for their occupancy. After survey it was decided that the part now known as the Flathead Reservation should be reserved for the use of the Flathead Tribes and they were moved out of the Bitterroot Valley in 1871 and located in the Jocko Valley near Arlee. Homes were built for the chiefs and irrigation ditches out of Finley Creek and the Jocko River were constructed by the Government. Prior to this time, in 1854, the Jesuit Fathers established a mission at the location of the present Catholic mission and school at St. Ignatius. This was done at the request of the Indians, who sent a delegation to St. Louis in 1831 asking Jesuit missionaries to come to the Flathead country. In addition to the Jesuit Fathers, the Sisters of Charity of Providence and the Ursuline Nuns established schools at the St. Ignatius Mission and at the time of allotment of the reservation lands were granted lands for their use in connection with the maintenance of schools and missions. The schools, hospital, farm, and flour mill operated by the St. Ignatius Mission have been of great benefit to the Indians of the reservation and to whites as well. Except for the grant of land, this mission receives no assistance from the Government.

By the act of April 23, 1904, Congress inaugurated the policy of allotting lands to the Indians in severalty and authorized the survey and allotment of lands of the Flathead Reservation and the sale and disposal of surplus lands not allotted to the Indians. This included a preliminary survey to find out whether an irrigation project was feasible or not. The irrigation scheme being reported favorably the act of March 3, 1909, provided the first appropriation for beginning construction. Subsequent acts provided appropriations for continuing the irrigation work. Prior to the act of 1916 appropriations for the irrigation work were reimbursable from the sale of land and timber belonging to the Flathead Tribes. The act of 1916 provided that all funds used for the irrigation project out of the tribal funds should be returned and that payments for the irrigation work should be made by the land benefited. It also provided for the assessment of construction charges against the lands of Indians, while former legislation had provided that Indian lands would not be required to pay construction charges

An arrangement was made between the Office of Indian Affairs and the Reclamation Service in 1907 whereby the Reclamation Service furnished the engineering organization to make surveys and to carry on the construction work. Survey work was begun July 8, 1907. Preliminary lines were run, reservoir sites selected and surveyed, topographic surveys were made of all lands considered irrigable, investigation was made of the power possibilities on the Flathead River, stream gauging was begun on all of the principal streams of the project. Detailed report on the preliminary investigations was made by Project Engineer R. S. Stockton under date of November 12, 1907.

The irrigable area of the project was first set at 152,000 acres. This has been reduced by elimination of areas later considered too rough for practical irrigation farming and on account of insufficient water supply, as found out by study of run-off. Some areas adjoining Flathead Lake, where the water supply was to be obtained entirely by pumping water from the lake, were eliminated.

Lands considered irrigable	1910	Present
Acreage adjoining Flathead Lake	6,000	None.
Acreage in Mission Valley	110,000	100,000
Acreage along Sullivan Creek	3,000	None.
Acreage in Little Bitterroot Valley	12,000	11,000
Acreage near Dixon and Ravalli	4,000	1,100
Acreage near Arlee on Jocko Division	12,000	12,400
Acreage on Camas Prairie	5,000	None.
Total	152,000	124,500

Prior to the authorization of the irrigation project many Indians and whites in behalf of Indians had constructed ditches from many of the streams of the reservation. These were adjudicated by order of the Secretary of the Interior under date of June 27, 1912. Filings were made on all of the streams of the reservation for the project during the period immediately preceding construction and these filings have been kept up until actual use of the water was made through constructed ditches.

Allotment of land to Indians was begun in 1907. Every member of the tribe was given an allotment varying from 80 acres of land classed as irrigable to 160 acres of dry land. Timber land was in some cases selected in place of agricultural land. Land not selected by the Indians, except timber lands, was classified and made into farm units where considered irrigable, and into dry-land homesteads where considered agricultural land under dry-farm methods. These homesteads were opened for entry in 1910. Farm units comprise about 40 per cent of the irrigable area and are generally located farthest from the mountains where the soil is least productive and rainfall is least. All of the farm units were entered immediately after the opening of the reservation. In 1920 additional allotments were made of allotment reserves, grazing, and cut-over timber lands to Indian children born after the close of the first allotment period. These allotments provided 40 acres of irrigable land or 160 acres of grazing land to an individual.

The irrigation project embraces the Jocko, Camas, and Mission Valley units.

The Jocko unit.—This unit is in the southeastern part of the reservation along the Jocko River. The water supply is the Jocko River and tributaries and Revais Creek. The net irrigable area is 13,600 acres, of which 1,334 acres have a paid-up water right as to construction but receive water from project laterals.

Construction work was begun in 1909 and completed in 1910 for the construction of the Jocko Lateral "K" system diverting from Jocko River for lands on each side of Jocko River near Arlee, comprising about 7,500 acres of irrigable land. In 1911 excavation was made for laterals south of Jocko River, taking water from Finley, East Finley, and Agency Creeks and the Jocko River, comprising about 5,000 acres. On account of conflict with private rights, the structures on these laterals were not built until 1916. In 1923 and 1924 laterals were built for land near Ravalli and Dixon, taking water out of Jocko River and Revais Creek for the irrigation of about 1,000 acres of land. Lands under the Valley Creek unit which were originally a part of this division were eliminated from the project in 1918 at the request of the landowners and on account of the roughness of the lands. Several hundred acres along the east side of Jocko River north of Arlee are not yet supplied with water.

The water supply for lands on the south side of Jocko River near Arlee, supplied from Finley and Agency Creeks, have insufficient water for irrigation during the latter half of the irrigation season. It is planned to make a higher diversion out of Jocko River on the south side to supplement the water supply for these lands. Much of the lands along the Jocko River are gravelly and require a large amount of water for irrigation. Seepage in laterals through gravelly soil causes great loss of water and it is considered necessary to line many of the laterals with concrete to prevent this seepage. Wooden structures built in 1909 need replacement and should be constructed of permanent materials. The water supply for the Revais Creek unit of about 700 acres is likely to be short during dry seasons and provision should be made for a supplemental supply by pumping from Jocko River, since no reservoir sites are available.

The construction cost of the Jocko Division to date is $219,897.75. Work required to complete is estimated to cost about $300,000. The entire construction cost will be approximately $43 per acre.

The Camas unit.—This unit is in the western part of the reservation and receives its water from the Little Bitterroot River and tributaries. The net irrigable area is 11,000 acres. About 95 per cent of the land was homesteaded at the opening of the reservation in 1910. The first work on the construction of irrigation systems to this land was begun late in the season of 1916. The land is rather uniformly a clay silt soil, lacking humus, and the precipitation is probably less than 12 inches annually. Irrigation is necessary to growing of crops profitably in this unit.

The principal features of this unit are as follows: Little Bitter Root Lake Reservoir at the headwaters of the Little Bitterroot River. An earth embankment with concrete outlet structure was constructed in the fall of 1916 and the following winter. Additional work was done to strengthen this dam and to excavate an outlet channel in 1918.

Hubbart Reservoir, on Little Bitterroot River: In 1922 and 1923 a concrete arch dam was constructed to provide storage to the full proposed capacity of this reservoir, 12,000 acre-feet. A feeder canal about 1½ miles in length is required to complete this storage feature. Estimated cost, $7,500.

Dry Fork Reservoir: This reservoir is on Dry Fork Creek near Lonepine and is filled from this creek and from the Little Bitterroot River, using the Camas A canal as a feeder. Construction of an earth embankment in 1920 provided a storage capacity of 2,000 acre-feet in this reservoir. Enlargement of the reservoir to a total capacity of 3,500 acre-feet can be accomplished by raising the present dam 5 feet. Estimated cost of enlargement, $35,000.

The Camas A canal: This is the main canal of this division. Construction was begun in 1916 and completed in 1918. On account of sinkhole formation, difficulties were met in the priming of this canal and good service from it was not obtained until 1921. A large amount of betterment work is needed to place the canal in good operating condition and the estimated cost of this work is $32,000.

The lateral system was begun in 1917 and completed in 1919, with the exception of minor details estimated to cost $2,000. The entire cost of the construction of the Camas Division to date is $1,024,959.27. With an estimate of $77,000 for the completion of construction work, the actual cost of the Camas Division will be approximately $100 per acre as compared to $43 for the Jocko and $62 for the Mission Valley Divisions.

The Mission Valley unit is the main part of the project and comprises approximately 100,000 acres of land lying between the Mission Range of mountains on the east and the Flathead River on the west. The area given is conservative and will allow for the elimination of a considerable area of land that may not be considered suitable for irrigation at the present time. The water supply for this division comes by gravity from creeks rising in the Mission Range. It is planned to supplement this supply by pumping from Flathead Lake and River should the gravity supply prove insufficient for the full development of the irrigable area. A study of the water supply indicates that an additional supply of water must be obtained for 25,000 acres in the Mission Valley unit when all of the land irrigable uses water.

The principal features of the Mission Valley unit are as follows:

STORAGE FEATURES

Tabor feed canal, which diverts water from the Middle and North Forks of the Jocko River, carrying it into Tabor Reservoir. This canal was begun in 1922 and completed in 1924 at a cost of $208,867.12. The capacity of this canal is 60 second-feet from the Middle Fork to the North Fork, 175 second-feet from the North Fork to Falls Creek, and 200 second-feet from Falls Creek to Tabor Reservoir.

Tabor Reservoir, which has an ultimate capacity of 22,000 acre-feet, of which 12,500 is obtained by drawing the lake down about 65 feet below the normal level by means of a tunnel and the remainder by means of earth embankments which will raise the level of the lake 35 feet above normal elevation. The construction of the tunnel was begun in 1916 and completed in 1918 at a cost of $159,377.50. No work has been done on the embankment. Estimated cost to complete is $122,000.

Dry Creek lined canal, which connects Tabor Reservoir with the Pablo feeder canal. This canal has a length of 5.5 miles and a capacity of 250 second-feet; 4.2 miles of the canal was constructed in 1921 and 1922 at a cost of $128,378.80. The remaining part to complete the connnection with Tabor Reservoir is estimated to cost $45,000.

The Pablo feeder canal, which begins at Dry Creek and extends north along the foot of the Mission Range for 45 miles to the Pablo Reservoir. This canal has a capacity of 200 second-feet from Dry Creek to Mission Creek; 250 second-feet from Mission Creek to Post Creek; and 400 second-feet from Post Creek to the Pablo Reservoir. However, about 11 miles of the lower end of the canal requires enlargement at an estimated cost of $100,000. The construction of this canal began in 1910 and the first work of construction was completed in 1921. Enlargement from Post Creek toward Pablo Reservoir began in July, 1923, and was stopped in December, 1924, on account of lack of appropriations. The entire cost of the Pablo feeder canal to date is $514,848.11.

Mission Reservoir, located on Mission Creek just above the crossing by the Pablo Feeder canal: This reservoir has a proposed capacity of 6,000 acre-feet and an estimated cost for construction of $250,000. No work has been done on this reservoir.

McDonald Lake Reservoir on Post Creek: This reservoir has an ultimate capacity of 10,500 acre-feet and is now constructed to a capacity of 8,200 acre-feet. It is doubtful if the present dam will ever be enlarged. The first work of construction was done in 1916 and 1917 and consisted in the construction of the outlet works and placing of a small embankment providing about 2,000 acre-feet storage. The earth embankment and concrete spillway were constructed in 1919 and 1920. The total cost of the construction of this reservoir to date is $234,084.91. The estimated cost to raise the embankment to provide the maximum proposed storage is $96,000.

Kickinghorse Reservoir: This reservoir is located on the prairie about 2 miles north of Post Creek. An earth embankment across a flat coulee will make the reservoir. The Kickinghorse feeder canal now constructed will supply water for storage from the flood run-off of Post Creek and another canal from Crow Creek north of the reservoir site will serve the same purpose. This reservoir, together with the Ninepipe Reservoir, mentioned later, furnished storage for about 25,000 acres of the Post subdivision surrounding the town of Charlo. No work has been done as yet in the Kickinghorse Reservoir. The proposed capacity is 6,800 acre-feet and the estimated cost of construction is $185,000. The feeder canal from Crow Creek is estimated to cost $50,000.

Ninepipe Reservoir: This reservoir is about 1 mile below the Kickinghorse Reservoir site and is obtained by making earth embankments across a flat coulee. It is filled by the Kickinghorse feeder canal, which was constructed in 1911. The first work of construction on the Ninepipe Reservoir was begun in 1910 and continued in 1911, making a storage of about 5,500 acre-feet capacity. The completion of the embankment work to full capacity of 15,150 acre-feet was done in 1923. Except for the placing of about 2,000 cubic yards of riprap at an estimated cost of $5,000, this reservoir is completed. The cost to date is $160,587.11. A feeder canal connecting Ninepipe and Kickinghorse Reservoir sites was excavated in 1911 but was not completed as to structures. Water has been run through a natural drainage channel which has been sufficient for the small amount of water necessary to handle up to this time. The estimate of cost to complete the structures of the Ninepipe feeder canal is $15,000.

Pablo Reservoir: This reservoir is at the lower end of the Pablo feeder canal and is storage for the Pablo subdivision. The maximum proposed capacity is 25,000 acre-feet and the present capacity is 13,000 acre-feet. Construction of this reservoir was first begun in 1912 and finished in 1913 to provide 6,000 acre-feet capacity. Enlargement was again made in 1918 to increase the capacity to 13,000 acre-feet. The North Pablo Reservoir, which was constructed in 1912, was abandoned in 1916 on account of excessive loss through the bottom as the result of sinkholes, and the Pablo feeder canal, which emptied into the North Pablo Reservoir, was continued around this reservoir to connect with the feeder canal below and between the North and the South Pablo Reservoirs. Cost of construction of the South Pablo Reservoir to date is $279,564.62. The estimated cost to enlarge the South Pablo Reservoir, now known as the Pablo Reservoir, is $250,000.

Lower Crow Reservoir: This site is on Crow Creek just above the diversion for the Moiese canal. The proposed capacity of the reservoir is 5,000 acre-feet. It will be filled direct from the run-off of Crow Creek and will provide storage for 5,000 acres of the Moiese Valley, The estimated cost for the construction of this reservoir is $133,000. No work has been done.

Twin Reservoir: This reservoir site is located east of Polson and north of the Polson Ridge. It has a proposed capacity of 970 acre-feet. Estimated cost of construction, $30,000. It will conserve the flood waters of Big Creek for use on lands north of the Polson Ridge and along the south shore of Flathead Lake.

The total cost of storage system for the Mission Valley Division to date is $1,241,545.06.

Lateral systems.—The irrigable area of the Mission Valley unit is estimated at 100,000 acres, with 88,000 acres now under ditch; 12,000 acres remain to be reached by the lateral system; 6,100 acres near Ronan; 760 acres near Polson; and 5,150 acres near St. Ignatius. The cost of new lateral systems is estimated at $265,000. The cost of betterment work, enlargement, and replacing wooden structures for the old lateral system is estimated at $528,200. The cost of the construction of lateral systems of the Mission Valley unit to date is $1,725,383.65.

Total cost of the Mission valley unit to date is $3,924.542.99.

The estimated cost to complete all features of the Mission Valley Division, not including any expenditures for future power development but including $625,600 for maximum need for pumping stations, is approximately $2,500,000.

Power development.—Appropriation of the waters of the Flathead River at the Newell Dam site in sec. 12, T. 22 N., R. 21 W., to the amount of 100,000 second-feet, was first made March 20, 1910, and construction of the Newell Tunnel at this site for the purpose of developing power for pumping water for irrigation and for other uses on the Flathead Irrigation project was begun early in 1909 and continued until December, 1911. At this time the tunnel had been driven 1,700 feet from the outlet to the shaft in which it was proposed to place the operating device. About 100 feet remained to break through into Flathead River. The work was discontinued at that time probably with the idea of postponing further development until the irrigation project had need of power for pumping water for irrigation, etc. The cost of the work done at that time was approximately $102,000. The only work done since that time was an investigation made in 1926 by Assistant Engineer, E. L. Rose, of the Indian Irrigation Service, in connection with the recent proposed development of the Newell power site by the project in accordance with the act of May 10, 1926. This investigation added about $5,000 to the cost of power development on the Flathead project.

The first plan for the irrigation of the Mission Valley unit anticipated that about 50,000 acres would be supplied by water pumped from Flathead Lake and River, using electrical power developed at the Newell power site. The remainder of the land would be irrigated by water flowing by gravity from the several creeks rising in the Mission Range. Further study of the water supply and storage possibilities indicated that a much larger area could be irrigated by the gravity supply than was at first supposed. It is now considered that supplemental supply by pumping will be required for the irrigation of the equivalent of 25,000 acres when the division has been fully developed.

The power possibilities on the Flathead Indian reservation are discussed in a report by Mr. E. C. La Rue, hydraulic engineer, United States Geological Survey, dated 1913; and the report of Assistant Engineer E. L. Rose, of the Indian Irrigation Service, February 2, 1927.

The use of the appropriation made by the Act of May 10, 1926, and the act of January 12, 1927, has been held up by the necessity of a repayment contract to be executed by the landowners of the project. In the meanwhile a power company is making a strong bid to be given a permit to develop the Flathead River power sites and deliver power for project uses at nominal costs. This proposition is receiving serious and favorable consideration by the department and by the project landowners.

5. LOCATION, TRANSPORTATION, AND MARKETS

States	Montana (northwestern part).
Counties	Lake, Sanders, and Missoula.
Townships	16 to 24 N., R. 19 to 24 W., M. P. M.
Railroads	Northern Pacific Railway has about 75 miles of its line within the reservation. The line runs through both the Mission and Jocko units. Perma, the nearest station to the Camas unit, is about 20 miles from the center of the unit.
Railroad stations	Camas unit: Perma. Jocko unit: Arlee, Evaro. Mission Valley unit: Ravalli, Dixon, Moisse, D'Este, Charlo, Ronan, Pablo, Pelson.

Cities and towns	Polson, 1,500; Pablo, 200; Ronan, 600; Charlo, 200; St. Ignatius, 400; Ravalli, 100; Arlee, 200; Dixon, 200; Hot Springs, 300; Camas, 100; Perma, 40; Big Arm, 50; Elmo, 20; Dayton, 40; Evaro, 50.
Highways and roads	Coast-to-coast highway; Park to Park Highway, Glacier to Yellowstone; gravel, 80 miles; graded, 200 miles.
Markets	Butte, northern coast cities, and east to Mississippi River points.

6. AREA AND CLASSIFICATION OF RESERVATION LANDS

Area of reservation as first established	acres	1, 192, 917
Area of reservation at present	do	817, 834

IRRIGATION ON FLATHEAD RESERVATION, MONT.

(*a*) *Area, classification, and estimated value of individual Indian and tribal lands*

Acres	Classification	Per acre value	Total value
2, 500	Now irrigated	$40. 00	$100, 000
24, 727	Under canal but not irrigated	30. 00	741, 810
4, 400	Irrigable by proposed works	30. 00	432, 000
202, 055	Dry-farm land Grazing land	10. 00	2, 020, 550
350, 000	Timberland	7. 00	2, 450, 000
200, 000	Mountainous and waste land	. 25	50, 000
34, 152	Reservoirs and power sites	2. 50	85, 380
817, 834	Total		5, 879, 740

(*b*) *Allotments.*—In 1906 to 1908 allotments of 80 to 160 acres each were made to all Indians then living, regardless of age or sex. In 1920 to 1922, all Indians born after the first allotment roll was closed were allotted 40 to 160 acres each. The allotments made to date are classified as follows:

Classification	Number of allotments	Unit area	Total area
		Acres	*Acres*
Irrigated, agricultural	1, 250	80	100, 000
Irrigable, agricultural	285	80	22, 800
Dry farming	605	80–120	56, 000
Grazing	340	160	54, 400
Wood lot	495	160	74, 802
Timber	405	80–120	37, 232
Total	3, 380		345, 234

One thousand five hundred and eighty-four "live" allotments, 176,052 acres, and 498 deceased allotments, 49,230 acres, are now under trust patent. It is estimated 75 allotments, aggregating 6,000 acres, are held under fee patent.

Six hundred and fourteen "deceased" allotments, aggregating about 52,000 acres, have been sold at an average of about $22 per acre, or approximately $1,150,000.

About 500 Indians now have no land, having received fee patents and sold their allotments. In all 860 fee patents have been issued.

7. POPULATION AND HEALTH CONDITIONS

Indian tribe, Flathead

	1910	1920	1925	1927
Indians	2,265	2,544	2,719	2,745
Indian births	73	78	82	35
Indian deaths	75	59	47	49
Whites	200	5,000	5,000	6,000
Total population	2,965	7,544	7,719	8,745
In towns	1,080	3,660	3,950	4,000

Indians having tuberculosis, 137. Trachoma, 378. Indians living in permanent homes, all. Full-blood Indians, 518. Less than full blood, 2,227. Indians receiving rations, 115.

8. CLIMATE

Period covered by reliable records, 1909 to 1927.
Range in elevation of irrigable area, 2,500 to 3,300.
Maximum temperature, 100°. Minimum temperature, −30°.
Average maximum temperature, 96°. Average minimum temperature −19°.
Average annual precipitation, 16.27.
Average annual rainfall, no data.
Average annual snow, no data.
Average date last killing frost (spring), May 1.
Average date first killing frost (fall), October 1.
Average growing season, 163 days.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(*a*) *Topography.*—A topographic survey has been made of all of the irrigable area. This work was under the supervision of Mr. E. F. Tabor, project engineer, with Mr. George E. Stratton, engineer in charge of party. Mr. C. E. Hewitt was topographer. Topographic surveys have been made for a gross area of about 200,000 acres. Plane table and alidade methods were used for the topographic survey; 5-foot contour interval on the Mission Valley and Jocko divisions, 1,000 feet to 1 inch, and 2-foot contour interval on the Camas division, 500 feet to 1 inch. Tracings were made of the topographic sheets and both tracings and original sheets are kept in the vault at the project office. The average slope is estimated at about 50 feet to the mile. There is a great variation in the slope of the irrigable lands. The maximum slope is 15 per cent and the minimum is about 10 feet to the mile. The irrigable area is generally broken into ridges and coulees. About 10,000 acres of the irrigable area is rather flat and in this area occur most of the isolated ridges and depressions. There is very little uniformly sloping land.

Per acre cost for clearing: The Camas division is the only part of the project in which the land was originally covered with sagebrush. Estimated cost of clearing where sagebrush covers the ground, $10 per acre. Per acre cost of plowing, $3. Per acre cost of leveling and ditching, smoothest lands, $3. Per acre cost of leveling and ditching, smoothest lands, $10; roughest lands, $50; average lands, $30.

(*b*) *Soil.*—A soil survey was made of the Camas division by Mr. A. E. Kocner of the Department of Agriculture, assisted by Mr. L. R. Gieseker of the Montana Experiment Station in 1925. The following is an approximate classification of the soils:

Acreage	Soil	Depth	Subsoil	Native vegetation
35,000	Silt loam	4 to 8 inches	Silt clay	Bunch grass good for grazing only. Some sagebrush.
25,000	Sandy loam	4 to 12 inches	Gravel and gravelly clay.	Clover, bluegrass, and bunch grass.
10,000	do	6 to 12 inches	Sand	Native bunch grass.
55,000	do	4 to 12 inches	Silt clay	Native grass, bluestem, and bunch grass.

Crop value on improved land is approximately $20 per acre average at the present time.

A few small widely scattered areas have been rendered nonproductive by alkali. The only drainage system is within the Polson town site, to relieve seepage on about 160 acres.

(*c*) *Irrigation methods and water delivery.*—Corrugation method is used on about 8,000 acres and wild flooding on the remainder.

The method of delivery, etc., and average head delivered, is on demand, except in a few ditches where rotation is necessary part of season. Average head of water delivered, 1.5 second-feet.

(*d*) *Duty of water.*—Average quantity of water used per season on each of various soil types and acreage of each. Silt loam, clay subsoil, 1½ acre-feet, per acre: 35,000 acres. Sandy loam, gravel subsoil, 3 acre-feet per acre; 55,000 acres. Sandy loam, sandy subsoil, 2¼ acre-feet per acre; 10,000 acres.

(*e*) *Principal crops and average crop production.*—Alfalfa, 2.3 tons; wheat, 78 bushels; oats, 32 bushels; barley, 23 bushels; potatoes, 154 bushels.

10. WATER SUPPLY AND WATER RIGHTS

(*a*) *Source*

Name of reservoir	Capacity	Storage and date if not filled	Average seasonal storage	Remarks
Camas division:	*Acre-feet*	*Acre-feet*	*Acre-feet*	
Dry Fork	2,000		2,400	
Little Bitterroot	18,000		4,000	
Hubbart	12,000	[1] 7,000	[2] 12,000	Feed canal to be constructed to increase supply entering reservoir.
Mission division:				
Tabor	12,500		16,000	This reservoir to be enlarged to 22,000 acre-feet capacity.
McDonald Lake	8,200		12,000	Possible enlargment to 10,500 acre-feet capacity.
Ninepipe	15,150	[1] 14,000	16,000	
South Pablo	13,000		14,000	Proposed maximum capacity 25,000 acre-feet.
Horto	250		1,000	

[1] Not filled in 1927.
[2] Estimated.

(*b*) *Project diversions—Acre-feet delivered to farms*

	1924	1925	1926
Acre-feet, for season	56,766	52,406	60,620
Acres irrigated	29,840	32,487	33,946
Acre-feet per acre	1.7	1.6	1.8
Average second-feet, April	0	0.1	0
Average second-feet, May	.56	.40	.46
Average second-feet, June	.23	.31	.49
Average second-feet, July	.70	.57	.56
Average second-feet, August	.28	.25	.27
Average-second-feet, September	.13	.06	.02
Average second-feet, October	0	0	0

(c) *Water supply*

	Amount filed on	Drainage area	Run-off	
			Maximum	Minimum
	Cubic feet per second	*Acres*		
Camas division: Litter Bitterroot and t ibutaries	10,000	172,000	32,913	18,495
Mission Valley division:				
North and Middle Forks, Jocko River	7,000	282,000	109,000	21,544
Dry Creek	2,000	17,000	14,100	7,592
Mission Creek	3,000	8,000	41,704	27,093
Post Creek	500	16,000	56,831	34,327
Crow Creek	4,000	70,000	69,081	34,633
Big Creek	1,000	4,000	5,035	2,899
Hell Roaring Creek	500	4,000		
Flathead River	100,000	4,870,000	11,829,600	5,883,000
Jocko Division:				
Jocko River	200	30,000	97,264	55,480
Finley Creek	500	21,000	28,060	16,087
Agency	100	4,000	9,850	6,765
Big Knife	100	3,000	8,240	6,020
Revais	120	14,000	17,684	11,699

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

(a) *General plan.*—The irrigation plan for the Flathead project provides for the irrigation of approximately 124,500 acres of land in various part of what was formerly the Flathead Indian Reservation. The water supply is from creeks and rivers rising in the Mission Range of mountains and the Little Bitterroot River and tributaries, with supplemental supply proposed by pumping from Flathead Lake and River. About 60 per cent of the irrigable land was allotted to Indians of the Flathead Tribes, about 4 per cent of the irrigable area became the property of the State of Montana and the remainder was homesteaded by whites.

The Flathead project is divided by geographical features into three main units or divisions for which the construction and operation and maintenance costs have been kept separate. The units are the Camas, Jocko, and Mission Valley.

The Camas division is in the extreme western part of the reservation in townships 21 to 24 north, ranges 23 and 24 west. The irrigable area is 11,000 acres and the water supply is from the Little Bitterroot River and tributaries. Construction work was begun in 1916. The first work was the construction of the Camas A Canal, which was completed early in 1918. The lateral system was begun in 1917 and completed, except for minor extensions, in 1918. A storage reservoir at Little Bitterroot Lake was begun in 1916 and completed according to first plans early in 1917. Additional work was done to this reservoir by widening the dam and excavating a channel below the dam in 1918. The principal storage, Hubbart Reservoir, was constructed in 1922 and 1923. Dry Fork Reservoir was constructed in 1920. On account of difficulty in delivering water through the Camas A Canal, the first reliable water service to the farmers of this division was given in 1921. Settlement of this division was principally by whites and was made in 1910 and 1911. Construction cost to date is $1,024,959.27. Estimated cost to complete, $77,000.

The Jocko division is in the southern part of the reservation along the Jocko and Flathead Rivers, in townships 16, 17, and 18 north, ranges 19, 20, 21, and 22 west. The irrigable area is 13,500 acres, of which about 600 acres can not yet be irrigated. The water supply is from the Jocko River and tributaries and Revais Creek. There are no storage reservoirs and the water supply is from direct flow only. A possibility for storage exists in the Jocko Lakes that has as yet not been explored sufficiently to furnish an estimate; however, storage is not planned under the present scheme. Construction work began in 1909 continued into 1910 for land on each side of Jocko River near Arlee. In 1911 more construction work was done for lands southeast of Arlee and the system for that part completed in 1916. For the lands of this division lying near Ravalli and Dixon construction work was begun in 1924 and completed in 1925.

The large part of the land of Jocko division near Arlee and Ravalli was allotted to Indians. The land near Dixon was largely homesteaded by whites.

Construction cost to date is $219,897.75. Estimated cost of work proposed to complete the irrigation system, which cost is principally for replacement of wooden structures by concrete and for lining laterals with concrete, is approximately $300,000.

The Mission Valley division is the principal part of the project. It lies between the Mission Range on the east and the Flathead River on the west in townships 18 to 22 north, ranges 13 to 22 west. The irrigable area is approximately 100,000 acres. The water supply is from creeks and rivers rising in the Mission Range, with supplemental supply proposed by pumping from Flathead Lake and River. Construction work was begun in 1909 and is about 65 per cent completed. About 88,000 acres of the irrigable area is now reached by the lateral system, with 12,000 acres not yet under the constructed works. Storage works are only about 50 per cent completed for this division. There are 4 reservoirs for which the construction work is partially completed, 1 completed, and 4 on which no construction work has been done.

The construction cost of the Mission Valley division to date is $3,924,542.99. The estimated cost of works proposed to complete the irrigation works is about $2,500,000.

(b) Division or units of project

Division	Total proposed irrigable area	Total present irrigable	Total irrigated area	Construction cost per acre (estimated)
Camas	11,000	11,000	4,000	$100.00
Jocko	13,500	12,900	4,900	40.00
Mission Valley	100,000	38,000	26,000	65.00

(c) Present condition of project

	Jocko	Camas	Mission Valley
Ultimate, irrigable area of project as proposed	13,500	11,000	100,000
Area that can now be irrigated	13,000	11,000	88,000
Area now actually irrigated	5,000	4,000	26,000
Total construction cost to date	$219,897.75	$3,924,454.60	$1,024,959.27
Per acre construction cost to date	$16.30	$93.18	$39.24
Estimated construction cost to complete	$300,000	$77,000	$2,300,000
Estimated per acre cost when completed	$40	$100	$65
Per cent of project construction now complete	40	93	65

(d) Construction work yet to be done—Principal features

Jocko division:	
Diversion dam for Jocko lateral K	$5,000
Replacement of wooden structures on laterals	80,000
Completion of lateral system	12,000
Concrete lining of laterals	150,000
South side Jocko Canal	40,000
Pumping plant for Revais Unis	13,000
	300,000
Camas division:	
Hubbart feeder canal	7,500
Betterment work on Camas A Canal	32,500
Enlargement of Dry Fork Reservoir	35,000
Structures on laterals	2,000
	77,000
Mission Valley division:	
Tabor Reservoir enlargement	122,000
Dry Creek lined canal	45,000
Mission Reservoir	250,000
Mission Valley division—Continued	
Kickinghorse Reservoir	185,000
Crow Creek feed canal	50,000
Ninepipe feed canal (structures)	15,000
Ninepipe Reservoir (riprap)	5,000
Pablo Reservoir enlargement	250,000
Lower Crow Reservoir	133,000
Twin Reservoir	30,000
Moiese Canal enlargement	15,000
Completion of lateral system to 12,000 acres	265,000
Pablo feeder canal enlargement	100,000
Betterment work, lateral systems	300,000
Pumping plants	463,000
Miscellaneous betterment work, engineering, etc	172,000
Purchase of reservoir sites	55,000
Permanent improvements, buildings, and grounds	15,000
Examination and surveys	30,000
	2,500,000

(e) *Construction costs by divisions and by principal features, with estimated cost for completion*

	Construction cost	Estimated additional cost to complete
Jocko division:		
Examinations and surveys	$9,539.00	$300,000.00
Lateral system	201,408.44	300,000.00
Farm unit surveys	5,603.62	
Permanent improvements and lands	1,645.00	
Telephone system	1,701.69	
	219,897.75	300,000.00
Mission Valley division:		
Examination and surveys	63,904.83	30,000.00
Storage system	1,241,545.06	1,095,000.00
Canal system	643,226.91	217,000.00
Lateral system	1,725,383.65	680,000.00
Pumping plants		463,000.00
Drainage system	53,515.70	
Power system	107,393.93	
Farm unit surveys	48,321.38	
Permanent improvements and lands	27,297.68	15,000.00
Telephone system	13,953.85	
	3,924,542.99	2,500,000.00
Camas division:		
Examinations and surveys	7,381.77	
Storage system	490,361.88	42,500.00
Canal system	270,469.71	32,500.00
Lateral system	241,571.07	2,000.00
Farm unit surveys	5,841.97	
Permanent improvements and lands	7,971.52	
Telephone system	1,361.35	
	1,024,959.27	77,000.00
Total, all divisions	5,169,400.00	2,877,000.00

12. SUMMARY OF PROJECT WORKS

(a) *Storage*

Name of reservoir or dam	Height	Length	Present capacity	Proposed ultimate capacity
	Feet	*Feet*	*Acre-feet*	*Acre-feet*
Tabor Reservoir	[1] 58	[2] 2,200	12,500	22,000
Mission Reservoir	66	1,700	None.	6,000
McDonald Lake	66	1,500	8,200	10,500
Kickinghorse	28	6,974	None.	7,000
Ninepipe	33	12,792	15,150	15,150
Lower Crow	65	850	None.	5,000
South Pablo	41	5,300	13,000	25,000
North Pablo Dam	25	2,150	[3]	[3]
Twin Reservoir	30	1,690	None.	970
Horte Reservoir	16	500	250	250
Hubbart	131	500	12,000	Same.
Dry Fork	33	3,000	2,000	3,500
Little Bitterroot	10	800	18,000	18,000

[1] Dam. [2] Also tunnel 1,754 feet long. [3] Abandoned.

(b) *Canals*

Capacity, 250 to 500 second-feet (miles)	15.4
Capacity, 50 to 250 second-feet (miles)	142.0
Capacity, 15 to 50 second-feet (miles)	615.1
Capacity, less than 15 second-feet (miles)	91.8
Total	864.3

Miles of distributaries per acre irrigable, 0.0055.
Drains: 17.8 miles (capacity, 15 second-feet).
Telephone system: Miles of line, 54; stations 9.

(c) Diversions

	Camas	Jocko	Mission Valley	Entire project
Canal head gates: Concrete	1	None.	8	9
Diversion dams	1	1	5	7
Tunnels:				
Number	1	None.	3	4
Length in feet	1,018		3,900	4,918
Flumes:				
Concrete	1	None.	None.	1
Length in feet	4,900			4,900
Steel	1	None.	17	18
Length in feet	170		8,438	8,608
Wood	None.	13	177	190
Length in feet		5,566	1,149	6,715
Pipe lines:				
Siphons	None.	1	10	11
Length in feet		780	17,800	18,580
Lateral head gates	3	7	24	34
Sublateral turnouts	63	34	360	457
Farm turnouts	320	260	2,130	2,710
Bridges, wood	39	40	286	365
Miles of canals	11	None.	55	66
Miles of laterals	82	85	644	811
Storage dams:				
Concrete	1	None.	None.	1
Earth embankment	2	None.	4	6
Material excavated:				
Class 1 (cubic yards)	580,700	243,397	5,128,151	5,954,248
Class 2 (cubic yards)	15,000	12,729	511,841	539,570
Class 3 (cubic yards)	33,300	4,696	105,543	143,539
Concrete (cubic yards)	20,594	1,131	18,906	40,631
Masonry (cubic yards)	1,132	45	579	1,756
Riprap (square yards)	7,842	290	25,304	33,436
Embankment (cubic yards)	97,522	None.	672,345	769,867

13. Area and utilization of irrigable lands

	1924	1925	1926
Utilization of Government project lands (entire project)			
Acreage arable	124,500	124,500	124,500
Acreage irrigable	110,000	112,000	112,000
Acreage irrigated	29,480	33,133	33,947
Acreage cultivated			27,219
Total crop value	$560,968.00	$850,011.00	$631,637.00
Average acre crop value	$17.83	$17.70	$17.10
Indians farming	116	116	116
Lessees farming	180	90	100
White owners farming	814	1,021	1,148
Under canal, but dry farmed	46,094	57,763	63,873
Utilization of land owned by Indians and not leased (Government project—farmed by Indians)			
Acreage arable	21,900	30,900	30,127
Acreage irrigable	29,000	28,000	27,227
Acreage irrigated	1,832	1,082	462
Acreage cultivated			432
Families farming	116	116	116
Cultivated per family			3.7
Total crop value	$28,596.00	$17,203.00	$6,748.00
Crop value (acre)	$15.70	$15.90	$14.85
Crop value (family)	$246.00	$148.00	$58.00
Utilization of land owned by Indians and leased (Government project—farmed by lessees)			
Acreage irrigated	5,696	2,035	1,848
Acreage cultivated			1,718
Number of lessees	180	80	100
Total crop value	$99,567.00	$36,630.00	$31,178.00
Acre crop value	$18.25	$18.00	$16.98
Utilization of land owned by whites			
Acreage arable	92,600	93,600	94,373
Acreage irrigated	22,312	30,016	31,637
Acreage cultivated			24,978
White owners farming	814	1,021	1,148
Total crop value	$432,805.00	$588,566.00	$593,710.00
Acre crop value	$19.56	$19.20	$19.47

14. PRINCIPAL CROPS, CROP YIELDS, AND RETURNS

(a) *Detailed crop data project lands irrigated (1926)*

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre	Total value
Indian farmers					
Alfalfa hay	102	2.2 tons	$8.00	$17.60	$1,832.00
Hay, miscellaneous	129	0.9 tons	8.00	7.50	960.00
Peas	108	10 bushels	2.10	20.00	2,192.40
Wheat	55	14 bushels	1.05	14.50	798.00
Miscellaneous	63			16.00	996.00
	452			14.60	6,748.40
Indian land, white leased					
Alfalfa hay	271	1.7 tons	8.00	13.84	3,616.00
Hay, miscellaneous	308	1.1 tons	8.00	8.80	2,704.00
Oats	243	27 bushels	.50	13.50	3,282.00
Peas	196	10.6 bushels	2.10	22.32	4,387.90
Wheat	571	19.3 bushels	1.05	18.77	11,556.30
Miscellaneous	247			17.43	4,333.00
	1,848			16.98	31,178.30
White farm					
Alfalfa hay	16,384	2.3 tons	8.00	18.70	306,200.00
Alfalfa seed	296	1.7 bushels	21.00	36.00	10,647.00
Barley	513	23 bushels	.80	18.78	9,632.00
Clover hay	437	1.6 tons	8.00	15.60	6,845.00
Clover seed	170	2.1 bushels	15.00	32.25	5,497.50
Corn	293	21 bushels	.80	16.80	4,909.20
Garden	279			100.00	27,900.00
Hay, miscellaneous	1,711	1.4 tons	8.00	10.90	18,616.00
Oats	1,445	31 bushels	.50	15.50	22,340.50
Pasture	5,568			10.00	55,687.50
Peas	425	10 bushels	2.10	21.00	11,091.20
Potatoes	266	156 bushels	.90	134.40	35,874.10
Wheat	3,459	18 bushels	1.05	18.30	63,354.85
Miscellaneous	659			18.31	12,079.00
	30,637			19.47	593,710.75

(b) *Crop valuation from project lands not irrigated but dry-farmed.*—The project crop census has not taken into account the area in different crops on dry-farmed land. A cultivated area census is taken each year to find out the entire area cultivated and this information is given in the following tables. The information given as to dry-farmed crop values is an estimate only. Very little dry farming is done except for grain crops. By summer fallowing fall wheat is grown very successfully and the area dry-farmed in this way is increasing each year. This means a crop every two years and the yearly average is not large. White men leasing several Indian farms on crop rental are making a success of wheat farming. It is not improving the country. Irrigated spring wheat of the "Federal" and "Dicklow" varieties are proving very successful and are making from 40 bushels to 53 bushels per acre as a rotation crop with hay and are bringing as good prices per bushel as the ordinary hard dry land wheat. The average for irrigated wheat has been low, due to the fact that irrigation of wheat has been used in an attempt to save a crop after it is found that rainfall is not sufficient and the crop has begun to suffer. Generally no plans are made to irrigate wheat crops and the emergency use of water is not well planned, the ground not prepared, and the ditches not properly located.

Crop returns on irrigated lands average low due partly to the fact that very little rotation of crops has as yet been practiced. Alfalfa fields seeded 10 years ago are still in the same stand. Up to the present there has been no market for sugar beets and the potato market has not been developed. With the assurance of a sugar-beet factory in Missoula immediately, it is expected that there will be a substantial acreage in beets next season. Some of the potato farmers are securing a market for seed potatoes. Through the activities of the county agriculturist, better seed in oats, barley, and wheat is being used, and stress laid upon irrigation of grain crops and rotation between hay and grain. Many new farmers are coming to the project.

Yields and crop returns on dry-farmed land in project

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre
Alfalfa	No information	1.25 tons	$8.00	$10.00
Barley	do	20 bushels	.80	16.00
Clover hay	do	1 ton	8.00	8.00
Corn	do	20 bushels	.80	16.00
Oats	do	do	.50	10.00
Pasture	do			5.00
Potatoes	do	100 bushels	.90	90.00
Wheat	do	15 bushels	1.05	15.00

Area cultivated by Indians, lessees, and whites on project area, not irrigated

	1924	1925	1926
Indians	3,846	2,865	4,108
Indian leased land	3,257	9,710	11,814
White owned land	39,230	45,197	48,654

A considerable number of Indians have homes and farm small tracts outside of the project irrigable. The project has no record of this, neither has the superintendent's office.

15. Economic conditions among Indian project farmers

	1924	1925	1926
Number of Indian farms	No information	No information	521
Indian families farming	do	do	[1] 120
Livestock:			
Horses	do	do	1,000
Cattle, beef	do	do	1,000
Cattle, dairy	do	do	100
Sheep	do	do	500
Hogs	do	do	1,000
Estimated value of livestock per farm	do	do	$1,200.00
Equipment:			
Plows	do	do	120
Mowers	do	do	120
Trucks	do	do	60
Estimated value of equipment per farm	do	do	$500.00
Acreage farmed by Indians (mostly dry farming)	do	do	12,000
Acreage farmed per family	do	do	100
Average crop value per acre	do	do	$10.00
Average crop value per family	do	do	$1,000.00
Per acre construction assessment against Indians	$0.50	$0.50	$0.50
Per acre operation and maintenance assessments against Indians.	$0.25	$0.40	[2] $0.40 [3] $2.00
Acres of Indian land leased:			
Irrigated			[4] 31,000
Not irrigated			[5] 65,000
Average rental per acre:			
Irrigated			$2.00
Not irrigated			$0.35–$2.00
Approximate total rental	No information	No information	$85,00
Indian land sold (irrigable)	930	658	780
Average price per acre	$15.50	$18.00	$12.50
Approximate total sale price	$14,422	$11,815	$9,717.00
Number Indians receiving payments from timber, agricultural, and grazing leases, oil, power, etc.	2,536	2,549	2,536
Average per capita annual payment from above sources	$50	$50	$50.00
Average total approximate payment to Indians from above sources.	$122,780	$127,450	$126,800.00
Indian reimbursable indebtedness, June 30, 1927 (not including irrigation charges).			$2,227.17
Number Indians receiving rations	120	120	120
Indian tribal fund June 30, 1927			$152,441.00

[1] Estimated. [2] Minimum. [3] Maximum. [4] Farming. [5] Grazing.

Source of tribal fund: Sale of timber, grazing fees, leases of tribal lands for agricultural purposes.

16. PROJECT OPERATION AND MAINTENANCE

(a) *Organization*

		Salary
Project engineer	per annum	$3,400.00
Chief clerk	do	2,500.00
Clerk	do	1,680.00
Assistant engineer	do	2,700.00
Water master:		
Camas division	per month	175.00
Jocko division	do	188.33
Pablo division	do	200.00
Post Creek subdivision	do	200.00
Mission subdivision	do	165.00
Foreman	do	150.00
4 ditch riders	maximum per month	135.00

Fourteen additional ditch riders are employed for periods of 3 to 6 months at wages from $100 to $120 per month.

(b) *Annual expenses (1927)*

	Jocko	Camas	Mission Valley	Total
OPERATION				
Canals and laterals: Services, patrolmen, etc	$2,068.73	$2,255.68	$12,357.92	$16,682.33
Storage: Services, patrolmen, etc		70.23	1,249.50	1,319.73
Miscellaneous and general expenses	445.01	569.78	3,257.32	4,272.11
Total operation cost	2,514.74	2,895.69	16,864.74	22,274.17
MAINTENANCE				
Canals and materials:				
Removal of weeds	141.58	622.14	2,233.29	2,997.01
Removal of silt, etc	522.04	1,884.82	6,683.18	9,090.04
Minor repairs and miscellaneous maintenance	1,702.07	1,873.56	17,900.18	21,475.81
Storage operation and maintenance:				
Removal of weeds			113.15	113.15
Removal of silt, etc		70.00	707.50	707.50
Maintenance of operating roads		70.92	18.00	88.92
Minor repairs to structures, etc		73.37	1,103.25	1,176.65
General expense	649.91	2,035.22	7,730.59	10,615.72
Total maintenance cost	3,427.32	6,682.73	37,529.90	47,639.95
Grand total	5,941.06	9,578.42	54,394.64	69,914,12

(c) *Comparison with neighboring projects*

	Flathead	Bitter Root irrigation district
Elevation, average	3,000 feet	3,600 feet.
Length of growing season	150 days	120 days.
Soil	Sandy loam, clay and gravel subsoil.	Sandy loam, gravel subsoil.
Water supply average	300,000 acre-feet	90,000 acre-feet.
Water service	Delivered to farms on demand at present but later by rotation.	Delivered to farms by rotation.
Crops grown	Hay, grain, vegetables, peas, beans, small fruit, pasture.	Same crops as those grown on Flathead.
Per acre crop value	$19 to $20.	$40 to $50.
Quality of construction	80 per cent permanent; 20 per cent temporary.	80 per cent permanent; 20 per cent temporary.
Total construction cost	Estimated average, $65 per acre	$31 per acre.
Annual per acre construction assessment.	50 cents	$2.44.
Annual per acre operation and maintenance assessment.	40 cents minimum to $2 maximum	$2.56.
Per cent of irrigable land cultivated.	75 per cent	80 per cent.
Per cent of irrigable land irrigated	30 per cent	Do.
Approximate irrigable area	112,000 acres	19,280 acres.

(D) NOTICE OF ANNUAL WATER CHARGES, FLATHEAD PROJECT, MONT.

Years 1926–27

1. *Charges for service.*—A minimum charge of 25 cents per acre on the Jocko division and 40 cents per acre on the Camas and Mission Valley divisions of the Flathead Indian irrigation project will be made against all lands within the project to which water can be delivered during the irrigation season of 1926, whether water is used or not, this minimum charge to be credited to the account of water delivered at the following acre-foot rates:

(*a*) On the Camas division, the Mission Valley division, and the Lower Jocko and Revais Creek lateral systems, for the period from the beginning of the irrigation season to June 30 at the rate of 50 cents per acre-foot; and for the period from July 1 to the end of the irrigation season at the rate of $1 per acre-foot.

(*b*) On the Jocko division (except for the lower Jocko and the Revais Creek lateral systems) lands receiving water from the Jocko River shall have water delivered at the following acre-foot rates: From the beginning of the irrigation season to May 31, at the rate of 25 cents per acre-foot; from June 1 to August 31, inclusive, at the rate of 50 cents per acre-foot; and from September 1 to the end of the irrigation season at the rate of 25 cents per acre-foot.

And for lands on the Jocko division receiving water from Finley Creek, East Finley Creek, Agency Creek, and Bigknife Creek, at the rate of 50 cents per acre-foot from the beginning of the irrigation season to May 31; from June 1 to August 31, inclusive, at the rate of 75 cents per acre-foot; and from September 1 to the end of the irrigation season at the rate of 50 cents per acre-foot.

Provided further, that on all parts of the project, namely, the Jocko, Mission Valley, and Camas divisions, the maximum charge for water delivered to any farm unit or allotment shall not exceed an amount equal to $2 per acre for the entire irrigable area of the farm unit or allotment.

2. *Application for water service.*—No water will be delivered except under an approved application. The irrigation season for this project covers the period from April 15 to October 15, inclusive. To receive full recognition for an irrigation season, application for water service should be filed in the office of the Indian irrigation service at St. Ignatius, Mont., sufficiently early so that the same can be approved by the United States on or before the opening of the irrigation season.

Every application accepted by the United States after May 1 shall be approved with the understanding that water will be delivered thereunder for the then current season only after the requirements of lands covered by applications previously approved shall have been fully provided for. Applications must describe the entire area which will be irrigated during the season.

3. *Terms of payment for water service.*—The charges for water furnished hereunder shall be due and payable on December 31 of each year for the preceding irrigation season. In all cases where charges are not paid on or before said date there shall be added a penalty at the rate of 6 per cent per annum so long as such default shall continue: *Provided*, That tenants must (*a*) make payment in advance for all water applied for, or (*b*) furnish an acceptable bond issued by a surety company guaranteeing payment of charges on December 31, following the irrigation season, or (*c*) in the event that the land is owned by a white person, furnish an instrument executed by such owner guaranteeing payment of charge on December 31, following the irrigation season. Water will not be furnished a tenant who is owing the United States a water charge of a prior season. All charges must be paid to the special disbursing agent, Indian irrigation service, St. Ignatius, Mont. Charges against Indian allottees on account of lands for which patents in fee have not issued shall be paid to said special disbursing agent through the superintendent of the reservation. The penalty charge shall not apply to trust patent Indian lands that are not leased.

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(*a*) *Construction cost to June 30, 1927*

Total construction cost to date:	
Jocko division	$219,697.75
Camas division	1,024,959.27
Mission Valley	3,924,454.60
	5,169,311.62

Estimated cost to complete for:	
Jocko division, 13,500 acres	$300,000.00
Mission Valley, 100,000 acres	2,500,000.00
Camas division, 11,000 acres	77,000.00
	2,877,000.00
(Note: Work required to complete irrigation system is for land now reached by laterals as well as for additional areas.)	
Present cost per acre for:	
Jocko division, 12,166 acres	18.00
Mission Valley division, 88,000 acres	44.60
Camas division, 11,000 acres	93.00
(Note: Irrigation system not complete for acreage now under lateral system.)	
Estimated per acre cost when completed:	
Jocko division	43.00
Mission Valley	65.00
Camas division	100.00
Per acre value of land without irrigation:	
Jocko division	5.00
Mission Valley	15.00
Camas division	4.00
Per acre value of land when irrigated:	
Jocko division—	
Without paid-up water right	30.00
With water right	60.00
Mission Valley—	
Without paid-up water right	40.00
With water right	100.00
Camas division—	
Without paid-up water right	25.00
With water right	75.00
Increased per acre value by irrigation:	
Jocko division, $25 to $55.	
Mission Valley, $25 to $85.	
Camas division, $20 to $70.	

(*b*) *Collection of construction cost.*—Collections are being made. Authority for assessment, act of February 14, 1920 (41 Stat. 409). Collections began in 1920 on irrigated area of lands irrigated that year. Since 1921 the assessments have been against the irrigable area of all lands, both Indian and white, to which water could be delivered. Collections were made from Indian and white owners only, not from lessees.

Total construction assessments to date:	
Jocko division	$32,728.22
Mission Valley division	252,662.35
Camas division	27,322.34
	312,712.91
Per acre annual construction assessment (all divisions)	.50
Total construction collections to date:	
Jocko division	8,233.52
Mission Valley division	59,609.94
Camas division	6,945.44
	64,788.90
Total construction collections to date from:	
Indians—	
Jocko division	1,006.00
Mission Valley division	2,483.53
Camas division	67.50
White owners—	
Jocko division	7,227.52
Mission Valley division	57,126.41
Camas division	6,877.94
No collections from lessees.	

Total construction delinquencies to date:	
Jocko division	$24, 494. 70
Mission Valley division	193, 052. 41
Camas division	20, 376. 90

(c) *Operation and maintenance cost to June 30, 1927*

Total cost of operation and maintenance to June 30, 1927:	
Jocko division	80, 978. 97
Mission Valley division	621, 585. 97
Camas division	72, 290. 62
Total	774, 855. 56
Reimbursable appropriations	469, 810. 08
Collections used	305, 045. 48

(d) *Operation and maintenance collections to June 30, 1927.*—The basis for computing the per acre annual operation and maintenance assessment is: Jocko division, 12,000 acres; Mission Valley, 88,000 acres; Comas division, 11,000 acres. Notice of charges for season are made about April 1. Bills are mailed November 15, and due December 31. Penalties begin January 1 following. Water service is refused when operation and maintenance charges are delinquent. Collections are made from owners at end of current year and from lessees in advance of use of water.

Assessment for an individual farm is shown by the following example:

Take a farm of 80 acres gross, 75 acres actually irrigable; minimum operation and maintenance charge, 75 acres at 40 cents equals $30. This would be the assessment if water is not used or if the amount of water used at the acre-foot rates is less than the amount of the minimum charge.

Or, suppose 100 acre-feet of water used before July 1 at 50 cents per acre foot and 120 acre-feet used after July 1. The charge for water would then be as follows:

100 acre-feet at $0.50	$50
120 acre-feet at $1	120
Total	170

In this case the bill would be made for 75 acres at the maximum charge of $2 per acre, or a total of $150.

Or, suppose with the same farm the use of water was as follows: 80 acre-feet before July 1 and 100 acre-feet after July 1. The bill sent out would be as follows:

80 acre-feet at $0.50	$40
100 acre-feet at $1	100
Total	140

The assessment for the year is governed a good deal by the accruals of the preceding year and as to whether those accruals are sufficient to raise the funds required to operate and maintain the irrigation system, also whether satisfactory to the water users. The present rates have been the result of a trial of many rates and have proven the most satisfactory of any tried, considering returns to the project and satisfactory to the landowner. The minimum charge is a rate per irrigable area that will return the cost of maintenance of the project and of course is distributed to all irrigable lands whether water is used or not.

The acre-foot rates are made such as to return an additional amount that will pay the cost of operation. In this the water user is paying a larger amount than the one who does not use water and is paying the cost of operation and his share of the maintenance cost. To protect those who have gravelly and sandy land that requires a large amount of water which at the acre-foot rates would be a burden to the water user, the maximum charge of $2 per acre irrigable was added in 1925. On account of the large amount of land under absentee ownership or in trust patent status, it is not considered advisable to make a flat rate per irrigable acre whether water is used or not. This would be a burden on land owners who can not at present obtain a purchaser or a renter for all of the idle land to pay the operation and maintenance charges. It would also reduce the collections, since the one who does not use water is slow in paying. The water

users pay because they are obliged to in order to get water the following year. A reduction in the rate for the water user would reduce the returns annually. The maximum charge protects the water user against excessive charges. Accruals vary a good deal according to whether the season is rainy or dry. The rainfall on this project varies considerably from year to year during the irrigation season, and most of the farmers depend more than they should on rainfall to produce crops. It is planned to increase the minimum charge as the irrigable land comes more into cultivation.

The method of computing assessments is considered the most satisfactory of any method that is designed to return the cost of operation and maintenance of the irrigation system. There are practically no complaints against the rates.

Total operation and maintenance assessments to date:	
Jocko division	$29,333.75
Mission Valley division	362,301.49
Camas division	21,835.00
	413,470.24
Total operation and maintenance collecitons to date:	
Jocko division	13,242.72
Mission Valley division	286,998.06
Camas division	14,814.81
	315,055.59
Total operation and maintenance collections to date from:	
Indians—	
Jocko division	1,653.74
Mission Valley division	2,488.24
White owners—	
Jocko division	11,516.67
Mission Valley division	285,738.75
Camas division	14,814.81
Lessees—	
Jocko division	72.31
Mission Valley division	771.09
Total operation and maintenance delinquencies to date:	
Jocko division	16,091.03
Mission Valley division	75,303.43
Camas division	7,020.19
Total penalties on delinquencies to date	8,901.66

(NOTE—Not available by divisions.)

(d) Operation and maintenance collections to June 30, 1927

	1924	1925	1926
Per acre operation and maintenance assessments on Indian land not leased	(1)	(2)	(2)
Operation and maintenance collections	$39,259.25	$41,272.76	$37,895.58
On Indian land not leased	614.20	473.43	829.53
On Indian land leased	610.32	906.71	601.77
On white-owned land	37,834.73	39,593.62	36,454.28
Operation and maintenance delinquencies	12,156.07	15,328.31	26,425.48
On Indian land not leased	4,672.22	6,689.47	5,806.44
On Indian land leased	580.90	154.04	1,057.15
On white-owned land	6,896.76	8,484.80	19,499.63
Rate of penalty on delinquencies—per cent	6	6	6

[1] Minimum, 25 cents.
[2] Minimum, 40 cents; maximum, $2.

18. DISCUSSION OF PROJECT PROBLEMS

Climatic conditions.—The irrigable area ranges in elevation from 2,500 to 3,300 feet, with a range of temperature from a maximum of 100° to a minimum of −30°. The average precipitation is 16.27 inches and is said to vary considerably over the project, the rainfall being more on that portion of the project lying close to the base of the Mission range and decreasing westward toward the Flathead

River. With this amount of rainfall, it is possible to grow certain grain crops successfully a part of the time. This brings much of the land in the east portion of the Mission unit into the marginal state. The average production of the white owners for the three years, 1924 to 1926 inclusive, was a little under $20 per acre on the irrigated lands. While no very definite data as to average yields are given on the dry farming areas, certain yields and value of crops for some specific kinds of crops on dry farms are given as follows:

Crop:	Average value per acre
Alfalfa	$10
Barley	11
Clover hay	8
Corn	16
Oats	10
Pasture	5
Potatoes	90
Wheat	15

With the present slight differences in the production on dry lands and the irrigated lands, it becomes a difficult problem to force the farmer to adopt irrigation, and especially is that true when the farmer has been accustomed to depending on rainfall for his crops. The development of dry farming methods during the past few years, with the use of tractors and other labor-saving machinery, is enabling the dry farmer to produce a crop much cheaper than 10 years ago.

Duty of water.—The project manager estimates the present duty of water at from 1 to 3 acre-feet, depending considerably upon the type and class of soil. In the board report of March 11, 1918, the lowest duty for the Jocko unit was estimated at 4.77 acre-feet for that portion of the project watered from Jocko River and Big Knife Creek, and 2.55 acre-feet for that portion watered from Finley, Agency, and Revais Creeks. On the Mission unit, the highest duty was 1.59 acre-feet with waters from Dry, Mission, Post, Crow, and Nell Roaring Creeks, and 3.12 acre-feet for that watered from Crow Creek, which consisted of the Moiese Valley, and 2 acre-feet for the Camas unit.

The above are average duties for a considerable acreage. During the inspection of the project a number of examples were given us of a use of water considerably in excess of the above figures. One farmer on the Jocko unit stated that he had used 27 acre-feet and several others stated they required 7 acre-feet. Government employees admitted that there were some lands that required an excessive amount of water to grow a crop due to the shallow soil undrelaid with gravel. With a short water supply and prospects of pumping to supplement the same, it is not economical to attempt to irrigate such lands.

Project lands and farm conditions.—The ultimate irrigable area of the project is estimated at the present time by the project officials as 124,500 acres, consisting of 13,500 in the Jocko unit, 100,000 in the Mission unit, and 11,000 in the Camas unit. Of this amount, 30,127 acres, or 24 per cent, are in Indian ownership; 44,573 acres, or 36 per cent, have been purchased by the whites from the Indians; and 50,000, or 40 per cent, are homestead lands. Of the total amount of irrigable lands there are now under constructed canals, 112,000 acres, of which 33,947 acres, or 30 per cent, were actually irrigated during the year 1926. Of the lands irrigated, 462 acres, or 1.7 per cent, were farmed by Indians; 1,848 acres, or 6.8 per cent, leased Indian lands, and the balance were white-owned lands. Of the total of 112,000 acres under canal, 63,873 acres, or 57 per cent, were dry farmed. This leaves about 14,000 acres that were uncultivated.

Agricultural progress.—In 1913 the irrigation works were sufficient to serve 42,400 acres, but at no time since that date has the acreage irrigated reached more than 80 per cent of that amount, this percentage being attained in 1926, with 33,947 acres. In the meantime the irrigation system has been extended to cover 112,000 acres.

During the first six years of developing the project fairly good progress was made in bringing new lands under irrigation. There was an increase from 4,579 acres in 1915 to 32,816 acres in 1919. After this latter date there was a slight falling off, which was a little more than regained by 1926. During the past seven years practically no progress has been made in bringing new lands under irrigation.

On the other hand, the strides made in bringing new lands under cultivation by dry-farming methods has progressed rapidly. This kind of farming on the project has increased from 46,333 acres in 1924 to 63,873 acres in 1926, or 38 per cent in two years. The conditions in 1926, as shown in percentage of the total

acreage in the project under canal, are as follows: 30 per cent farmed by irrigation; 57 per cent farmed by dry farm methods; 13 per cent idle lands; total of 112,000 acres.

The problem would seem to be one not so much of bringing into cultivation the 13 per cent of idle lands, as developing a system of agriculture to make the irrigation of the lands now being dry farmed more profitable; enough so to induce the owners to irrigate their lands.

From an inspection of the project it would seem that a soil survey and land classification would somewhat reduce the acreage of the available idle acreage if not the per cent.

It is an admitted fact that the water supply is insufficient without considerable pumping to serve the present 112,000 acres under the main canal system. It would seem that the better method to follow would be first to make a soil survey and classification of lands under the present system. If the area is not then reduced sufficiently to be served with gravity water, enough of the better dry farming lands should then be excluded to bring the irrigable area within those lmits.

Construction work performed by Bureau of Reclamation.—On March 7, 1907, Secretary Garfield addressed the following note to Mr. F. H. Newell, Director of the Reclamation Service (now Bureau of Reclamation):

"I have requested the Commissioner of Indian Affairs to direct Mr. Code, chief engineer, to confer with you regarding the irrigation work now being done under the Indian Bureau. Please arrange as soon as possible a conference with Mr. Larabee and Mr. Code and prepare for my consideration a plan for the closest cooperation between your office and the Indian Office in the conduct of irrigation projects now under the jurisdiction of the latter office."

In accordance with these instructions a conference was held on March 8, 1907, and a memorandum of the working agreement prepared and signed by F. H. Newell and F. E. Leupp.

The following extracts from that agreement will give the scope of the general plan of cooperation.

"The object of securing the close cooperation between the Indian Office and the Reclamation Service is in order that the irrigation work being conducted under the jurisdiction of the Indian Office shall have immediate engineering supervision and executive action on technical affairs such as is necessary for the economical and speedy conduct of work of this character.

"After the general policy has been determined and the location, character, and cost of work approved in general terms by the Secretary of the Interior, the Director of the Reclamation Service should see to the execution of the work, assuming direct responsibility for materials, workmanship and economy of construction.

ORGANIZATION

"The chief engineer of the Indian irrigation service, Inspector W. H. Code, should report to the Secretary of the Interior, sending simultaneously a duplicate copy to the Director of the Reclamation Service. As chief engineer, Mr. Code is to have full responsibility for initiating detailed plans and estimates. He will be assisted by Inspector Walter B. Hill.

"The chief engineer should have a definite headquarters, preferable at one of the offices of the Reclamation Service, where he can have necessary clerical assistance and where mail and messages sent to him can in his absence be given attention by one of the assistants in the office of the Reclamation Service.

"The five superintendents of irrigation, instead of reporting directly to the Indian Office should receive directions from and report to Chief Engineer Code. All plans and specifications originating in the field should be submitted to him for approval and transmitted to the Director of the Reclamation Service for such action as may be necessary.

"The engineers of the Reclamation Service should be available for consultation on important details and in such event their expenses and salary when thus employed should be paid out of the appropriation fund for Indian irrigation, with the approval of the Secretary of the Interior. Chief Engineer Code should be available for consultatoin on reclamation matters, his time and expenses when so employed being charged to the reclamation fund, under the same conditions.

"Small projects involving the expenditure of a few hundred dollars for repairing, extending, or improving irrigation ditches should be left as far as practicable to the Indian agents with the advice and supervision of Chief Engineer Code and his assistants."

The above memorandum formed the general basis for the Bureau of Reclamation carrying out the construction work on the Flathead project, as well as the Blackfeet and Fort Peck projects, until the spring of 1924, at which time the Indian Bureau assumed the full responsibility of the projects.

Engineering works.—The major part of the construction work on the project has been of a permanent nature. It is estimated by the project management that 80 per cent of the work comes under this head. The remaining 20 per cent classified as temporary work will require renewal from time to time. All the important structures are of a permanent nature. The renewal of the temporary structures should be charged to maintenance and not to capital investment, as is often attempted. The plan of adopting timber for the unimportant structures rather than concrete, especially in a section where lumber is relatively cheap, appears a reasonable one. On many of the projects there is expensive concrete work in the less important structures that are standing idle because of changes in conditions, plans, etc., or in some cases are disintegrating, due to poor material, frost or alkali conditions, and will require renewing as quickly as the timber structures. In the light of experience, it is very questionable how far permanent construction should be carried on projects whose settlement and economic basis are not yet thoroughly established. It is often better to pay higher maintenance costs after a plant is a going concern than it is to get too high a capital cost at first. With the present state of agricultural development on this project there is no justification at this time to rebuild the 20 per cent of structures now classed as temporary by permanent construction.

Transportation and markets.—The Jocko and Mission units of the project are served by the Northern Pacific Railroad System. The main line passes through the Jocko unit and a branch line runs from Dixon to Polson through the center of the Mission unit. The Camas unit is segregated from the balance of the project and its nearest railroad connections are from 25 to 40 miles distant. The only transportation link connecting this unit with the railroad is over an unimproved earthen highway. There is some local market for the products of the project in Butte and the surrounding mining sections of Montana, but the main markets are the cities of the Northwest coast and the Mississippi Valley and east. A new beet-sugar factory now building at Missoula will offer a market for sugar beets.

Exclusion of certain lands.—Considerable sentiment was around Ronan against including these lands in the irrigation system. Claim was made that these lands would produce a good crop without irrigation in most years. Recently a petition has been filed with the Bureau by 77 land owners representing about 6,000 acres of these lands, requesting that no laterals or ditches be constructed to these lands, for the reason that the cost of placing said land under irrigation is prohibitive and unwarranted, as there is a sufficient amount of moisture in said territory to produce good crops without irrigation. These lands lie within a unit of about 14,000 acres formerly known as the "Crow division."

In an engineering board report dated March 11, 1918, is found the following regarding these lands:

"As to the complete elimination of the Crow division, the reasons therefor, besides limited water supply, are as follows: The lands generally are rough and rolling and in some localities sandy, all being difficult to irrigate. They have, however, rich soil, are located in the heaviest snow belt of the project, and give good production without irrigation, even in unfavorable years. If there were abundant water available for all lands in the project it would be desirable to irrigate the lands in the Crow division, for crops could undoubtedly be increased by irrigation; also, if funds for irrigation were now being furnished from the Indian tribal fund and since practically all lands within the Crow division are included in allotments to Indians, there might then be some reason for irrigating these lands and omitting other lands, even though irrigation for such lands were not so necessary. Funds are being furnished now, however, from the general fund of the Treasury, and it is our opinion that there would be no justification for spending such funds in any other manner than such as will result in maximum benefit for any given expenditure.

"None of the canals or laterals for this division have been constructed so that the elimination of these lands will not result in the abandonment of any constructed works. Should future records of water supply show water to be available for additional lands and should the value of irrigation to the lands in the Crow division be deemed at that time sufficient to warrant increasing the capacity of storage reservoirs at the high cost which such increases will involve, the lands can be included again in the project."

The above report was approved by the director and chief engineer of the Bureau of Reclamation, by whom the work was then being done.

The project engineer states that 12,000 acres remain to be reached by the lateral system in order to irr gate 100,000 acres in the Mission division, 6,100 acres of which are near Ronan. The board report above referred to placed the irrigable acreage in the Mission unit at 75,000 acres, which amount was limited by the water supply.

We see no reason at the present time for including the lands around Ronan and believe that the board report of March 11, 1918, should prevail as to these lands.

We doubt the wisdom of increasing the acreage of the division beyond the area that can be supplied by gravity-flow water. While the opportunity exists for the development of cheap power on the Flathead River, or securing the same from some commercial company that may develop it, we are of the opinion that the economic conditions at this time do not justify giving consideration to pumping water to supplement the present gravity water supply.

There are other lands within the unit that it is believed should be eliminated for the present as being unfit either because of thin soil with gravel subsoil or more costly than present economic conditions will justify.

Pending contract with irrigation district.—A contract has been worked out between the Flathead irrigation district and the Government, which provides for the district's assuming the obligation to repay the Government the money it has spent on the construction of the irrigation system for the white-owned lands and to provide for further and additional expenditures.

The Flathead irrigation district covers the larger part of the acreage of the project. There are two other small irrigation districts, one covering the Jocko unit and the other the area in Mission Valley south of Post Creek.

The above contract has been approved by the Government as to form and is now in the hands of the districts for action. The plans are for the three irrigation districts to enter into one contract with the Government, which provides for the Government continuing construction and the completion of certain features of the project. Provision is made for the exclusion from the obligation of the district of all the charges for trust patent Indian lands.

The districts obligate themselves to repay all construction cost heretofore or hereafter incurred on behalf of such lands, except that the water users of the Camas unit will not be charged more per acre than those of the Mission unit. The balance of the expenditure on the Camas unit spent for irrigation on that unit is to be repaid to the Government from net revenues derived from the operation of the power plant or transmission lines.

In view of the fact that under the appropriation act of March 7, 1928, provision is made for the leasing of the power site by the Federal Power Commission and the payment of rentals from the same to the tribal fund of the Indians, the only source of revenue remaining would be that derived from the operation of the transmission line, if built. It is difficult to see where any revenues would be obtained from this source. It must therefore be concluded that the Government must stand as a loss all expenditure heretofore made on the Camas unit over and above $65 per acre maximum provided by the contract, and for all expenditures for construction hereafter made. There has been expended on the Camas unit for construction to June 30, 1927, $1,024,959.27, or more than $93 per acre. Under the terms of the contract the Government will recover but $65 per acre, or will sustain a loss of $309,959 based on an irrigable acreage of 11,000 acres as claimed by the project management. Your advisors are convinced that a classification of the lands of this unit will materially reduce the acreage that can pay this per acre cost and will further increase the Government's losses. In addition thereto the contract contemplates a further expenditure of $9,500 for new work. The contract as drafted has been predicated upon an ultimate irrigable acreage of 13,500 for the Jocko unit; 11,000 for the Camas unit; and 100,000 for the Mission Valley unit, or a total of 12,4500 acres, which gives a present construction cost of $16.30 for the Jocko unit; $93.10 for the Camas unit, and $39.24 for the Mission Valley unit. The estimates to complete the project as outlined by the project management will cover an expenditure that will consume the balance of the per acre limits of expenditure contemplated in the contract, namely $40 per acre for the Jocko unit and $65 per acre for the balance of the project.

The contract does not state the ultimate acreage that is to be used in arriving at the per acre cost, but the present per acre cost of the different units based upon these acreages are common knowledge among the people of that project and were in common use by people with whom your advisors conversed.

Your advisors are firmly convinced that there must be a considerable scaling down of the acreage on this project by a soil survey and land classification before a sound economic basis is attained. This should be done before any contract is signed or submitted to the water users for the following reasons:

Evidently it is not the intention of the Government to spend more than $40 per acre on the Jocko unit and $65 per acre on the balance of the project. If it is found after the contract is signed that one-fourth of the acreage must be excluded because of land that is found unfit or not capable of meeting the charges or being cultivated for other reasons, the per acre costs under a joint liability contract have been increased one-third.

A favorable vote by the districts for entering into a contract at this time would be influenced by the knowledge of the present per acre cost and the anticipation of works that are yet to be constructed before the limit of the per acre charge is reached.

As is well known, an overestimation of the irrigable acreage was one of the great sources of error on reclamation projects, that has led to all kinds of misunderstanding between the Government and the water users.

In fairness to the water users and in order to eliminate future trouble between them and the Government, the determination of the acreage upon which the construction costs are to be predicated should be ascertained as accurately as is humanly possible at this time and the results placed before the water users before a vote is taken. The present acreage used is nothing more than a rough estimate and not established upon a thorough and systematic investigation as to the suitability or quality of the lands.

It should be further pointed out that the draft of the contract makes no provision for future drainage of project lands that may hereafter become seeped. Under the terms of the contract it would hardly be possible to get a favorable vote of the district or districts to vote supplemental construction for drainage purposes as each farm unit can not be held for more than its proportionate share, not exceeding $40 per acre on the Camas and $65 per acre on other units. If the necessity of drainage should arise on a portion of the project after the limit of expenditure has been reached as provided, the Government will be left holding the bag for the unpaid construction costs on such lands, or will be obligated to spend the money for accomplishing the drainage of the same without any provision for the return of the expenditure.

As drainage is a community problem, the whole district or districts should pay for the same. The contract should therefore provide an expenditure of $10 to $15 per acre, all of which should be a part of the future expenditure within the $40 or $65 per acre.

Financial condition.—The construction cost of the project to June 30, 1927, is $5,169,311.62. There has been expended for operation and maintenance $774,855.56, making a total cost of $5,944,167.18, of which $74,788.90 has been collected for construction, and $315,055.59 for operation and maintenance, or a total collection of $389,844.49, leaving a net cost to the Government of $5,554,322.69. Construction collections have been assessed on the irrigable area since 1921. During the year 1920, construction assessments were based on the area of lands irrigated for that year. These apply to both white and Indian land owners. No construction collections have been made from lessees of Indian lands. The total construction assessments to date are $312,602.81, of which $74,794.12 have been collected, leaving $237,804.69 as uncollected accruals. Operation and maintenance charges are collected upon a basis of 12,000 acres on the Jocke unit, 88,000 acres on the Mission Valley unit, and 11,000 acres on the Camas unit, a total of 111,000 acres. The minimum rates have varied from time to time, and also the rates based upon the amounts of water used. The rates are announced at the beginning of the irrigation season, April 1, and are due and payable December 31, next. The total accruals to June 30, 1927, are $413,470.24, of which $315,055.59 have been collected, leaving a delinquency of $98,324.65. The delinquencies are not enforced except by the threat of nondelivery of water. In this manner, there is no compelling incentive for anybody to pay. Delinquent construction accruals carry no interest or penalties, while the operation and maintenance carry 6 per cent. If this project is to pay its operation and maintenance and construction assessments, a more strenuous collection policy must be adopted.

Construction collections.—The first construction collections were assessed in 1920 under a public notice dated November 29, 1920, providing for a payment of 50 cents per acre. The following table shows the construction accruals and collections by fiscal years under the above mentioned and subsequent notices.

Fiscal year	Accruals	Collections
1921	$13,964.68	$9,471.38
1922	47,881.30	15,356.25
1923	48,115.00	8,882.53
1924	48,112.00	3,848.65
1925	48,083.66	14,377.03
1926	52,422.79	11,417.69
1927	54,023.38	11,440.59
Total	312,602.81	74,794.12

During the fiscal year 1921 the assessments accrued on the land actually irrigated, but since that date the assessments are based upon the irrigable area which the project could serve with water. The following public notice gives the terms and conditions under which these assessments are made and collected:

RULES AND REGULATIONS REQUIRING PARTIAL PAYMENTS ON CONSTRUCTION COSTS, NOVEMBER 29, 1920

1. *Act of February 14, 1920.*—The Indian appropriation act of February 14, 1920 (41 Stat. 409), directs the Secretary of the Interior to require all owners of irrigable lands under any irrigation system heretofore or hereafter constructed for the benefit of the Indians to which land water for irrigation purposes can be delivered to begin partial reimbursement of the construction cost, at such time and in such amounts as the Secretary may deem best; all payments to be credited on a per acre basis in favor of the land in behalf of which such payments shall have been made, and to be deducted from the total per acre charge assessable against said land.

2. *Definition of "owners" and "users of water."*—The words "owners" and "users of water" as used in said act are construed to include any person, Indian or white, or any firm, partnership, corporation, association, or other organization to which title to the land to which water for irrigation purposes can be delivered has passed, either by fee or trust patent or otherwise, and also any entryman or allottee of such land.

3. *Lands subject to partial payments for the year 1920.*—The lands under the Flathead project hereby made subject to partial payments for the year 1920 are those lands to which the United States delivered water during the irrigation season of 1920.

4. *Amount of payments required.*—Construction charges have not yet been determined or announced for said project. For the year 1920 each acre of the lands described in paragraph 3 shall be subject to a charge of 50 cents. These charges shall be paid by the owner of the land to the special fiscal agent, United States Reclamation Service, St. Ignatius, Mont.: *Provided*, That as to lands of Indian allottees for which patent in fee has not issued the charges shall be paid to said fiscal agent, through the Bureau of Indian Affairs. The charges shall be due and payable on December 1, 1920, and to all charges not paid on March 1 next following the due date there shall be added a penalty of 1 per cent thereof, and a like penalty of 1 per cent on the first day of each month thereafter, so long as such default shall continue, and no water shall be delivered to land for which such charges and penalties are unpaid one year or more after the due date. All principal sums so paid will be credited upon the construction charge per irrigable acre, hereafter to be announced for public notice.

5. *Lands subject to partial payments for the year 1921.*—The lands for which water can be delivered for irrigation purposes during the irrigation season of 1921, which shall be subject to the above-mentioned charge, will be shown upon plats to be filed at a later date in the respective offices of the Indian Service and the United States Reclamation Service at St. Ignatius, Mont., and in the local land offices located, respectively, at Missoula and Kalispell, Mont.

The solicitor for the department found there was no provision of law to justify the collection of a money penalty on the Flathead project.

The public notice of December 7, 1921, contains the same general provisions as the previous public notice with the exception of omitting the penalty of 12 per cent per annum on delinquent accruals. There was added a proviso that in case of a water shortage a reduction in the rate woule be made in the same proportion that the area in such division for which water is sufficient is to the total area of the division subject to said charge.

After the solicitor's opinion cited above, which was accepted by the bureau, there was no method to compel the water user to pay the construction charges other than the refusal to deliver water (provided for in both public notices) or the bringing of suit against the delinquent owner.

While the refusal to deliver water is not effective against the owner who does not farm his land or the farmer practicing dry farming methods, it is effective against the owner who is irrigating and one or more years in arrears, if enforced.

From the records and correspondence there seems to have been no effort to enforce this provision of the public notices heretofore issued. This was in part due to relief legislation passed by Congress for reclamation projects, which was made applicable to the Indian project. This legislation, however, did not carry extensions on the Indian projects past March 1, 1927.

Correspondence in the Indian Office from early in 1925 to date states "that water shall not be delivered to landowners who have not paid the operation and maintenance charges for the years 1924 and following." No mention of collection of construction charges is made and the field service has taken this to mean that water may be delivered to lands delinquent in payments of construction charges. (Letter of W. S. Hanna to project engineers district 3, dated May 29, 1925, and letter of C. J. Moody to advisory committee dated March 11, 1928.)

In a letter from the Indian Bureau (having departmental approval), to W. S. Hanna, supervising engineer of district 3, dated April 9, 1927, various aspects of the accrued charges and penalties are discussed. Certain discussions with Mr. Johnson, president of the Water Users Association, are commented upon regarding the situation in regard to delinquent accruals. It is finally pointed out that "there is no law authorizing further extensions of time in which to pay delinquent charges; there is no law prohibiting the furnishing of water to landowners on the Flathead project who are indebted to the Government; therefore, in all proper cases where application is made for water for this irrigation season and there are no unpaid charges accruing subsequent to March 2, 1924, you may in your discretion furnish water to such landowners during the irrigation season of 1927." (Letter to W. S. Hanna dated April 9, 1927.) Having pursued a policy of delivering water to water users who are in arrears on construction, the Government is at this time in no moral position to enforce collections against owners who have not used water.

The policy of delivering water to those more than one year in delinquency differs from the policy stated or conveyed in the justification submitted to the subcommittee of the House Committee on Appropriations. On page 333 of the hearings, it is stated:

"A large amount of the uncollected construction repayments are for lands that are not using water. No penalties accrue from nonpayment except refusal of water service. In addition privilege of postponement of payment of these charges has been granted to worthy cases among the Indians."

While it may be argued that no extensions have or are being granted, the policy of giving the farmer water while he is a year or more delinquent has the same effect as an extension and in fact constitutes an extension.

It is not surprising that so poor a showing in collections has been made, but on the contrary it is surprising that so good a showing as the collection of 24 per cent of the accruals has been made under the plan pursued.

The 50 cents per acre per annum has been a very modest collection, and if that could not be met, then the project must be considered next to worthless and the Government is not justified in putting in another dollar on further construction.

Your advisers can find no justification or reason why these small yearly charges should not have been collected from all white owners of land. As to collections from Indian owners, reference is made to the general recommendations in this report.

Operation and maintenance charges and collections.—Operation and maintenance since 1924 are assessed on the entire irrigable area that can be served with water from the system, based upon a minimum charge per acre whether water is used or not. The land using water is charged a certain stipulated price per acre-foot of water used, varying on different units of the project and for different periods of the irrigation season. The minimum charge is credited on the water used. These rates have varied from year to year For the year 1924 and prior years, assessments were based on the acreage irrigated or that for which a water rental contract was made. The operation and maintenance public notice for the years 1925 and 1926 contained a proviso that the maximum charge would be limited to $2 per acre. The total operation and maintenance cost to June 30, 1927,

amounts to $774,855.56 and collections amount to $316,404.95, leaving an unpaid balance of $458,450.61. Of this latter amount, $98,414.65 is carried as an accrual against certain specific land. This leaves $360,035.96 as an unassessed balance. This latter has been increasing from year to year, until it has now reached the above amount, and while a major part of it was due to the limited acreage paying operation and maintenance during the period that a small acreage was being irrigated, nevertheless the annual costs within recent years have exceeded the accruals as follows:

Operation and maintenance costs, accruals, and collections

Fiscal year	Costs	Accruals	Collections
1925	$57,833.65	$51,415.32	$39,259.25
1926	72,597.60	56,328.31	41,272.76
1927	77,444.22	64,321.06	37,896.58
Total	207,875.47	172,810.78	118,437.59

There is an apparent lack of appreciation, on most projects, that an operation and maintenance charge, like taxes, is a continuing expense, and unless paid will continue to mount, and therefore should not be allowed to accumulate. Construction payments differ in that putting off paying installments does not add to the total. For the past three years the accruals or total amount assessed has only been 83 per cent of the costs and the amount collected 57 per cent.

The cost of operation and maintenance tends to increase, due in part to more renewal of structures and the building or unforeseen structures demanded by an increasing settlement of the lands. This is shown in the operation and maintenance during the past seven years, as follows:

Fiscal year	Acreage irrigated	Operation and maintenance costs	Cost per acre irrigated
1921	32,836	$44,420.27	$1.35
1922	28,821	56,404.82	1.95
1923	30,811	46,505.72	1.51
1924	29,840	30,798.72	1.03
1925	31,748	57,833.65	1.82
1926	33,133	72,597.60	2.19
1927	33,838	77,444.22	2.32

It will be noted that there has been an increase in operation and maintenance costs of more than 75 per cent between 1921 and 1927 with an increase of only 1,000 acres actually irrigated.

The basis for making these assessments, as already pointed out, is (1) a minimum charge on the acreage that can be served with water, and (2) an additional charge for water used over a stipulated amount. It is evident that the rates should be increased either on the minimum charge (the readiness to serve charge) or the rate per acre-foot, or both. It becomes a very difficult matter to increase these rates to take care of the deficit of previous years without a great deal of dissatisfaction to the water users, and especially so after the lapse of several years. With the changing of the farm population and the ownership of land, the water user will argue, and with a large degree of justice, that in paying charges for services previously rendered he is paying the debts of his predecessor.

Nor only should the rates be increased to yield the estimated cost, but to create a reserve to cover delinquencies that can never be collected. This principle is recognized in the irrigation district laws of some of the States wherein the assessment rate must be increased 10 to 15 per cent above that required to raise the necessary funds in order to cover delinquencies. There is no question that a soil survey and classification of lands will show that some of the accruals in the past have been on lands that will never be able to pay, and therefore the amount per acre of back unassessed costs will be greater than would appear from the present figures.

There is a strong incentive on the part of the water user and the management to use as large an acreage as possible in arriving at unit costs or unit rates in order to keep them as low as possible. Your advisors therefore feel that they can not

too strongly urge the elimination of every acre of doubtful land that will be unable to meet these payments, and to this end a soil survey and land classification are essential from every angle of the situation. It must precede all other considerations in working out the problems of the project in order to give a proper foundation upon which to predicate other considerations in arriving at a solution of the many problems facing this project.

Under the present system the Government carries the cost of operation and maintenance of any year until the end of the irrigation season. Bills for the season's services are rendered at the end of the season, payable December 31. Delinquent operation and maintenance bills carry 6 per cent per year penalty. It is provided that lessees shall pay in advance. There is no apparent reason why the operation and maintenance public notices should not provide for paying these charges in advance of the delivery of water for the season.

Irrigation on Gila River Reservation, Ariz.

1. RECOMMENDATIONS

Your advisors respectfully recommend that:

1. The Indians on the Gila River Indian Reservation be furnished a free water right for 28,000 acres in so far as the cost of the San Carlos Reservoir is concerned.

2. The free water right cited above shall be equitably allocated to each Indian allotment on a per acre basis and only the additional water necessary to complete a full water right shall become a lien on the Indian land for reservoir construction.

3. All Indian lands shall bear their equitable part of the cost of the diversion and distribution works and that the same shall be a lien on their lands.

4. The share of power at Coolidge Dam which may be represented by the water right for the 28,000 acres mentioned above shall be the property of the Government and any net income from the same shall be applied to the cost of these water rights from the reservoir.

5. The project limits be set at not to exceed 80,000 acres and in so doing the Indians' rights to water for the entire irrigable acreage should be fully protected.

6. The cost of the Sacaton Bridge, the open conduit in the Sacaton Dam, the excess cost of the China-Wash or Olberg flume over and above the cost of a type of approved structure suitable under good engineering practices for such conditions and portion of other works which are not useful in the final completed project shall not constitute a part of the construction costs.

7. Any of the old Indian canals which were not constructed by Government funds and are useful in the reconstructed project or canals which were useful to the Indian lands, but because of the redesigning of the project now become useless, should be appraised as a part of the construction costs and the lands to which they belonged credited with such amounts on their construction costs. The appraised amount should be the value at the time taken or rendered useless.

8. Provision should be made in arriving at the final construction cost for ample funds to take care of the drainage situation as the necessity for its development may arise. To accomplish this an investigation should be made by a competent drainage engineer; a tentative plan worked out, and an estimate of cost made, prior to fixing the per acre construction costs.

9. As a basis for establishing the construction cost a board should (upon the completion of the project other than drainage, make an appraisal of the cost of the works that finally enters into the completed project. This appraisal, together with the estimate of future drainage, shall be the cost of the project.

10. A soil survey and classification of the lands be made as a basis for establishing the per acre cost.

11. Due to the high cost of leveling some of the land and the difficulties in leveling in small 10 or 20 acre tracts and also due to the fact that these Indians have for the past 30 years or more been deprived of a large part of their water supply, through neglect of the Government to protect their water rights, have been driven to poverty, the Government should give consideration to the problem of leveling these lands. The cost of the same should be made reimbursable as a part of construction charge.

12. The Indians be given the services of farm advisers to assist them in developing their agriculture. The service should be sufficient to give frequent and adequate advice and by men of the county agent type.

13. The construction costs against Indian lands be held as a lien against the land but should not be accrued, until the Indian title passes to fee patent. When

title so passes construction charges should be made on the basis of 2½ per cent of the construction charge, but not less than $3 per acre per annum.

14. All Indian lands not farmed by Indians be leased in accordance with the general recommendations heretofore made and the proper portion credited to construction.

15. The Government make annual appropriations to carry the operation and maintenance costs for Indians farming their own lands or that of their own families, not exceeding 40 acres.

16. Upon completion of the project the operation and maintenance shall be put upon a payment in advance basis and that all white landowners, lessees, and Indians farming in excess of 40 acres, be required to pay the per acre assessment against their land before water is delivered.

2. SYNOPSIS

The Gila River Indian Reservation is located in Pinal and Maricopa Counties, Ariz., and on the main line of the Southern Pacific Railroad.

The territory north of the Gila River was acquired from Mexico by the treaty of Guadalupe-Hidalgo and that south of the river by the Gadsden purchase. The early travelers found the Indians farming and irrigating by methods, the origin of which were unknown at that time. They are still using some of the old canals.

Executive orders of August 31, 1876, and continuing on to 1913 directed investigations for dam sites. The various acts of Congress beginning about 1895 authorized and provided for the construction of an irrigation system for the Pima Indians in the vicinity of Sacaton, Ariz. Prior to 1903 the Government only made repairs on old Indian ditches. White settlements began on the stream above shortly after the reservation was created. These have gradually taken the water from the Indians. In 1903 and 1904 experimental wells were put down. Up to the present time 10 wells have been constructed and operated with power from the Salt River project. The appropriation for 1905 carried the first funds for a construction program, which consisted of the construction of flood water canals. The Bureau of Reclamation did the work and about this time the Santan Canal was built.

Construction work on the Sacaton Dam was commenced in 1923 and completed in 1925 at a total cost of $668,659.91, this amount including the cost of the bridge.

By act of June 7, 1924, Congress authorized the construction of a dam known as the Coolidge Dam, across the cañon of the Gila River about 9 miles above San Carlos, Ariz. This dam is now in the process of construction.

Reservation lands and allotments.—The reservation, as originally established contained 10,160 acres, it being 371,422 acres at present. Beginning in 1914, all Indians living were allotted, each receiving 10 acres agricultural and 10 acres grazing land. In all 4,894 allotments were made, which are held under trust patent. None has been sold. Over a period of seven years the Indians on the reservation have increased from 5,389 to 5,575. In 1927 there were 172 cases of tuberculosis and 300 cases of trachoma; 108 Indians were receiving rations.

Climate.—Elevation, 1,100 to 1,600 feet. Temperature, maximum 120°; minimum 8°. The rainfall on the project averages 9.74 inches. It has a growing season of eight and one-half months.

Topography, soil, and drainage.—The average slope of the irrigable area is 10 feet per mile. The cost of clearing, leveling, and ditching this land averages $50 per acre. The lack of drainage has stunted the growth of crops in parts of the reservation. Up to the present time no drainage system has been constructed, the border method of irrigation being in use. The lack of water supply makes it impracticable to establish the duty of water. The principal crops grown are corn, wheat, maize, barley, and cotton.

Water supply and water rights.—The water supply is from the Gila River, which has an annual run-off of 284,968 acre-feet. The Coolidge Dam, now under construction, will form the only reservoir for Indian lands. The use of water on the upper stretches of the river by the whites has, year by year, decreased the supply for the Indians.

On October 3, 1925, a suit for the adjudication of the waters of the Gila River was filed in the United States District Court. The complainants set forth that the Pima Indians were using water for irrigation when the white man first came. A claim for 249,480 acre-feet of water for the Indian lanes was also filed. In accordance with legislation, Executive orders, etc., the Government recognized

the rights of the Indians to land and water by occupancy and possession. Water is delivered to 1,080 acres of Indian land under the Buckeye decree.

General plan of irrigation development.—The San Carlos project contemplates the reclamation of 45,000 acres of Indian land and 55,000 acres of white owned lands. The Coolidge Dam will provide reservoir facilities for stored flood water.

The Ashurst-Hayden (Florence) Dam diverts water for Florence Casa Grande unit. A system of canals and laterals is now under construction and will be incorporated in the larger project. The estimated area in the completed project is 100,000 acres. The system can now irrigate 16,000 acres.

Summary of project works.—Forty-eight and nine-tenths miles of canals; cost, including dikes, road, and levees, $363,971. Numerous small structures, costing $359,057. Ashurst-Haydon Dam, costing $244,005. Sacaton Dam and bridge superstructure including dikes, levee and riprapping, costing $719,793.

Area and utilization of irrigable lands.—In 1926 there were 646 Indians farming, producing crops valued at $254,641. The value of the lessees' crops was $67,144.

Principal crops, crop yields, and returns.—On 10,424 acres cultivated by the Indians, the principal crops were 1,113 acres of corn, yielding 2.15 bushels, valued at $18.75 per acre; 4,850 acres of wheat, yielding 15.98 bushels, valued at $19.18 per acre; and 760 acres of maize, yielding 2.17 tons, valued at $37.50 per acre.

White owners had in cultivation 1,810 acres. Of this, 1,700 acres were in cotton, yielding 1.4 bales per acre, valued at $56.50 per acre, and 90 acres in alfalfa, yielding 4 tons, and valued at $80 per acre.

Economic conditions among project farmers.—In 1926 there were 676 Indian families farming, owning livestock valued at $190 per farm; farm equipment $116 per farm and had crop returns per family valued at $372.

Project operation and maintenance.—The annual expense for this project is approximately $15,000, which includes pumping operations.

Construction and operation, maintenance costs and collections.—Cost to date, $3,455,967.31. Estimated cost to complete, $6,257,482. No construction or operation and maintenance assessments have been made. Operation and maintenance costs to June 30, 1927, are $117,628.46.

3. DIGEST OF LEGISLATION, TREATIES, AND EXECUTIVE ORDERS

(*a*) *Legislation.*—Act July 1, 1898 (30 Stat. 594): For ascertaining the depth of the bedrock at a place on the Gila River in Gila County, Ariz., known as the Buttes, and particularly described in Senate Document 27, Fifty-fourth Congress, second session, and for ascertaining the feasibility, and estimating in detail the cost, of the construction of a dam across the river at that point for the purpose of irrigating the Sacaton Reservation, and for ascertaining the average daily flow of water in the river at that point, $20,000, or so much thereof as may be necessary, the same to be expended by the Director of the United States Geological Survey, under the direction of the Secretary of the Interior: *Provided*, That nothing herein shall be construed as in any way committing the United States to the construction of said dam. And said director shall also ascertain and report upon the feasibility and cost of the Queen Creek project mentioned in said Senate document.

Act March 3, 1905 (33 Stat. 1081), section 10: For the construction of an irrigation system for developing and furnishing a water supply for the irrigation of the lands of the Pima Indians, in the vicinity of Sacaton, on the Gila River Indian Reservation, the sum of $50,000, to be expended under the direction of the Secretary of the Interior: *Provided*, That the total cost of the entire construction and installation of said irrigating system shall not exceed $540,000: *Provided further*, That when said irrigation system is in successful operation and the Indians have become self-supporting the cost of operating the said system shall be equitably apportioned upon the lands irrigated and to the annual charge shall be added an amount sufficient to pay back into the Treasury the cost of the work within 30 years, suitable deduction being made for the amounts received from disposal of lands which now form a part of the said reservation.

Act June 21, 1906 (34 Stat. 333): For the same purposes as specified in the act of March 3, 1905, $250,000.

Act March 1, 1907 (34 Stat. 1022): That the Secretary of the Interior may, in his discretion, use such part of the $300,000 heretofore appropriated for an irrigation system for the Pima Indians in the payment of such Indians' proportionate part of the construction of the Salt River project, and such funds may be transferred to the reclamation fund, to be expended by that service in accordance with its rules and regulations; the Indians to receive a credit upon the reclamation

charge assessed against their lands under the Salt River project for the amount so transferred.

Act April 4, 1910 (36 Stat. 272) * * *: For continuing the work of constructing an irrigation sustem for the irrigation of the lands of the Pima Indians in the vicinity of Sacaton, in the Gila River Indian Reservation, $75,000: *Provided*, That the amount hereby appropriated and all moneys heretofore, herein, or hereafter to be appropriated for this project, shall be repaid into the Treasury of the United States in accordance with the provisions of section 10 of the act of March 3, 1905.

Act March 3, 1911 (36 Stat. 1062): For continuing the work of constructing an irrigation system for the irrigation of the lands of the Pima Indians in the vicinity of Sacaton in the Gila River Indian Reservation, $125,000.

Act August 24, 1912 (37 Stat. 522): For maintenance, including purchase of electricity for irrigation wells already completed, and the completion of the lateral irrigating ditches thereunder in connection with the irrigation of the lands of the Pima Indians in the vicinity of Sacaton, in the Gila River Indian Reservation, $15,000: *Provided*, That the proportion of the cost of the irrigation project on the Gila River Indian Reservation heretofore and herein authorized to be paid from the public funds shall be repaid into the Treasury of the United States as and when funds may be available therefor: *Provided further*, That in the event any allottee shall receive a patent in fee to any allotment of land irrigated under this project before the United States shall have been wholly reimbursed as herein provided, then the proportionate cost of the project, to be apportioned equitably by the Secretary of the Interior, shall become a first lien on such allotment, and the fact of such lien shall be recited on the face of each patent in fee issued and the amount of the lien set forth therein, which said lien, however, shall not be enforced so long as the original allottee or his heirs shall own the allotment; and the receipt of the Secretary of the Interior, or of the officer, agent, or employee duly authorized by him for that purpose, for the payment of the amount assessed against any allotment as herein provided shall, when duly recorded by the recorder of deeds in the county wherein the land is located, operate as a satisfaction of such lien: Provided also for investigation by a board of Army engineers the feasibility of building a storage dam on the Gila River near San Carlos.

Act June 30, 1913 (38 Stat. 84): For maintenance, care, and protection of machinery and irrigation wells on the Gila River Reservation, $5,000.

For continuing the investigation by the Secretary of War for the purpose of determining the feasibility and practicability of constructing a dam and reservoir at or in the vicinity of the Box Canyon on the San Carlos Indian Reservation and for other purposes, $10,000.

Act August 1, 1914 (38 Stat. 597): For maintenance, care, and protection of machinery and irrigation wells on the Gila River Reservation, $10,000, reimbursable, from any funds of said Indians now or hereafter available.

For investigation recommended by the board of engineer officers of the United States Army as set forth in their report to the Secretary of War, and report as to the supply of the legally available water, acreage available for irrigation and titles thereto, the maximum and minimum estimated cost of the San Carlos irrigation project, including dams and necessary canals, ditches, and laterals, with recommendations and reasons therefor and the probable cost of adjudicating the water rights along the Gila River necessary thereto, and to take the steps necessary to prevent the vesting of any water rights in addition to those, if any, now existing until further action by Congress, $50,000.

Joint resolution March 4, 1915 (38 Stat. 1228), reenacted the item of August 1, 1914, for the fiscal year 1916.

Act May 18, 1916 (39 Stat. 129): For continuing the work of constructing an irrigation system for the irrigation of the lands of the Pima Indians in the vicinity of Sacaton, on the Gila River Indian Reservation, within the limit of cost fixed by the act of March 3, 1905, $10,000; and for maintenance and operation of the pumping plants and canal systems, $10,000; in all $20,000, reimbursable as provided in section 2 of the act of August 24, 1912, and to remain available until expended.

For beginning the construction by the Indian Service of a dam with a bridge superstructure and the necessary controlling works for diverting water from the Gila River for the irrigation of Indian land and Indian allotments on the Gila River Indian Reservation, Ariz., as recommended by the Board of Engineers of the United States Army in its report to the Secretary of War of February 14,

1914, $75,000, to be immediately available, reimbursable as provided in section 2 of the act of August 24, 1912, the total cost not to exceed $200,000.

For beginning the construction by the Indian Service of a diversion dam and necessary controlling works for diverting water from the Gila River at a site above Florence, Ariz., as estimated by the Board of Engineer officers of the United States Army in its report to the Secretary of War of February 14, 1914, $75,000, to remain available until expended, the total cost not to exceed $175,000; *Provided*, That said dam shall be constructed as a part of a project for the irrigation from the natural flow of the Gila River of Indian lands on the Gila River Indian Reservation and private and public lands in Pinal County, Ariz.: *And provided further*, That the water diverted from the Gila River by said diversion dam shall be distributed by the Secretary of the Interior to the Indian lands of said reservation and to the private and public lands in said county in accordance with the respective rights and priorities of such lands to the beneficial use of said water as may be determined by agreement of the owners thereof with the Secretary of the Interior or by a court of competent jurisdiction: *And provided further*, That the construction charges for the actual cost of said diversion dam and other works and rights shall be divided equitably by the Secretary of the Interior between the Indian lands and the private and public lands in said county; and said cost as fixed for said Indian lands shall be reimbursable as provided in section 2 of the act of August 24, 1914 (37 Stat. 522); but the construction charge as fixed for the private and public lands in said county shall be paid by the owner or entryman in accordance with the terms of the act extending the period of payment under reclamation projects approved August 13, 1914 (38 Stat. 686): *And provided further*, That said project shall only be undertaken if the Secretary of the Interior shall be able to make or provide for what he shall deem to be satisfactory adjustments of the rights to the water to be diverted by said diversion dam or carried in canals, and satisfactory arrangements for the inclusion of lands within said project and the purchase of property rights which he shall deem necessary to be acquired, and shall determine and declare said project to be feasible.

That the Secretary of the Interior be, and he hereby is, authorized and directed to cause to be made by competent engineers the necessary examinations, investigations, and surveys for the purpose of determining the most suitable and practicable method or methods of constructing levees, revetments, or other suitable works sufficient to prevent the Gila River from further eroding and wearing and washing away its banks and from further overflowing its banks at any point in Graham County, Ariz. Said engineers shall also determine and report upon the most suitable, feasible, and practicable means of holding the said river within a fixed channel as it flows through said Graham County. Said Secretary shall submit to Congress the result of such examinations, investigations, and surveys, together with an estimate of the cost thereof, with recommendations thereon, at the earliest practicable date. The sum of $10,000 or so much thereof as may be necessary, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, for the purpose of conducting said investigations, examinations, and surveys.

Act March 2, 1917 (39 Stat. 974): For continuing the work of constructing the irrigation system for the irrigation of the lands of the Pima Indians in the vicinity of Sacaton, on the Gila River Indian Reservation, within the limit of cost fixed by the act of March 3. 1905, $10,000; and for maintenance and operation of the pumping plants and canal systems, $10,000; in all, $20,000, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522).

For completing the construction by the Indian Service of a dam with a bridge superstructure and the necessary controlling works for diverting water from the Gila River for the irrigation of Indian land and Indian allotments on the Gila River Indian Reservation, Ariz., as recommended by the Board of Engineers of the United States Army in paragraph 217 of its report to the Secretary of War of February 14, 1914 (H. Doc. 791), $125,000, to be immediately available and to remain available until expended, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522), the total cost not to exceed $200,000.

For completing the construction by the Indian Service of a diversion dam and necessary controlling works for diverting water from the Gila River at a site above Florence, Ariz., $100,000, to remain available until expended, the total cost not to exceed $175,000, and for beginning the construction of the necessary canals and structures to carry the natural flow of the Gila River to the Indian lands of the Gila River Indian Reservation and to public and private lands in Pinal County, as provided in the Indian appropriation act approved May 18, 1916, $75,000, to remain available until expended; in all, $175,000.

Act May 25, 1918 (40 Stat. 568): For the same purposes as specified in the first paragraph of the act of March 2, 1917, $5,000; and for maintenance and operation of the pumping plants and canal systems, $10,000; in all, $15,000, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522), and to remain available until expended.

For the same purposes as specified in the second paragraph of the act of March 2, 1917, $50,000, to be immediately available and to remain available until expended, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522): *Provided*, That the limit of cost of the said dam and bridge fixed by the act of May 18, 1916 (59 Stat. 130), is hereby changed from $200,000 to $250,000.

For continuing the construction of the necessary canals and structures to carry the natural flow of the Gila River to the Indian lands of the Gila River Indian Reservation and to public and private lands in Pinal County, reimbursable as provided in the Indian appropriation act approved May 18, 1916, $50,000, to remain available until expended.

Act of June 30, 1919 (41 Stat. 10): For same purposes as specified in the first paragraph of the act of March 2, 1917, $7,500; and for maintenance and operation of the pumping plants and canal systems, $7,500; in all, $15,000, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522).

Act February 14, 1920, reappropriated July 1, 1922 (42 Stat. 773): For the same purposes as specified in the third paragraph of the act of May 25, 1918, $150,000.

Act March 3, 1921 (41 Stat. 1225): For same purposes as specified in the first paragraph of the act of March 2, 1917, $5,000; and for maintenance and operation of the pumping plants and canal systems, $10,000; in all, $15,000, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522).

For the same purposes as specified in the second paragraph of the act of March 2, 1917, $150,000, to be immediately available, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522): *Provided*, That the limit of cost of the said dam and bridge fixed by the act of May 25, 1918 (40 Stat. 569), is hereby changed from $250,000 to $400,000.

For completing the construction by the Indian Service of a diversion dam and necessary controlling works for diverting water from the Gila River at a site above Florence, Ariz., as provided by the act of May 18, 1916 (39 Stat. 130), $75,000, to be immediately available: *Provided*, That the total cost is hereby changed from $175,000 to $250,000 to remain available until expended, reimbursable as provided by the aforesaid act of May 18, 1918.

Act May 24, 1922 (42 Stat. 559, 580): For the same purposes as specified in the first paragraph of the act of March 2, 1917, $5,000; and for maintenance and operation of the pumping plants and canal systems, $10,000; in all $15,000, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522).

For the same purposes as specified in the third paragraph of the act of May 25, 1918, $75,000, to be immediately available: *Provided, however*, That not exceeding $50,000 of the appropriations available for the construction of this project may be used in the purchase of such land, rights of way, constructed or partly constructed canals, and other physical properties deemed necessary by the Secretary of the Interior in connection with such project.

Act January 24, 1923 (42 Stat. 1174): For the same purposes as specified in the first paragraph of the act of March 2, 1917, $3,000; and for maintenance and operation of the pumping plants and canal systems, $10,000; in all $13,000, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522).

For the purposes specified in the act of May 25, 1918, $150,000.

Act June 5, 1924 (43 Stat. 390): For the same purposes as specified in the first paragraph of the act of March 2, 1917, $8,000; and for maintenance and operation of the pumping plants and canal systems, $12,000; in all, $20,000, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522).

Act June 7, 1924: For the same purposes as those specified in the third paragraph of the act of May 25, 1918, $250,000.

Act March 3, 1925 (43 Stat. 1146): For the same purposes as those specified in the first paragraph of the act of March 2, 1917, $5,000; and for maintenance and operation of the pumping plants and canal systems, $15,000; in all $20,000, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522).

For the same purposes as those specified in the act of May 25, 1918, $200,000, of which amount not to exceed $10,000 shall be available for acquiring by purchase or condemnation proceedings lands needed for necessary rights of way in connection with the construction of the project.

For commencement of construction work on a dam across the Canyon of the Gila River near San Carlos, Ariz., to be hereafter known as the Coolidge Dam, for the purpose first, of providing water for the irrigation of lands allotted to the Pima Indians on the Gila River Reservation; and, second, for the irrigation of such other lands in public or private ownership as in the opinion of the Secretary of the Interior can be served water impounded by said dam without diminishing the supply necessary for said Indian lands as provided for in the act approved June 7, 1924 (43 Stat. 475–476), $450,000, to be immediately available: *Provided*, That said sum, or so much thereof as may be required, shall be available for purchase and acquiring of land and necessary rights of way needed in connection with the construction of the project: *And provided further*, That the total amount appropriated shall be reimbursed to the Treasury of the United States in accordance with said act of June 7, 1924.

Act May 10, 1926 (44 Stat. 458): For operation and maintenance of the pumping plants and irrigation system for the irrigation of the lands of the Pima Indians in the vicinity of Sacaton on the Gila River Indian Reservation, Ariz., $15,000, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522).

For the same purposes as specified in the third paragraph of the act of May 25, 1918, $150,000, of which amount not to exceed $5,000 shall be available for acquiring by purchase or condemnation proceedings lands needed for necessary rights of way in connection with the construction of the project.

For construction of the Coolidge Dam across the canyon of the Gila River near San Carlos, Ariz., as authorized by the act of June 7, 1924 (43 Stat. 475–476), and under the terms and conditions of, and reimbursable as provided in said act, the unexpended balance of the appropriation for this purpose for the fiscal year 1926 is reappropriated and made available for the fiscal year 1927: *Provided*, That no part of the money herein reappropriated shall be available in the fiscal years 1926 or 1927 for relocation of the railroad right of way.

For necessary repairs, operation and maintenance of the Sacaton Dam and bridge superstructure across the Gila River, near Sacaton, Ariz., reimbursable in accordance with the act of August 24, 1912 (37 Stat. 522), there is hereby made available until June 30, 1927, not exceeding $7,000 of the unexpended balance of the appropriations made in the act of March 2, 1917 (39 Stat. 974–975), for the construction of the Sacaton Dam and superstructure: *Provided*, That the remainder of the unexpended balance of said appropriation, amounting to $1,800 shall be covered into the Treasury and carried to the surplus fund immediately upon the approval of this act.

Act January 12, 1927 (44 Stat. 934): For all purposes necessary for continuing the construction of the canals and structures and for drains, pumping plants, transmission lines, and other project works, and for the maintenance and operation of existing structures, to distribute the waters of the San Carlos project to the Indian lands of the Gila River Indian Reservation and to public and private lands in Pinal County, Ariz., begun under the Indian appropriation act of May 18, 1916, so as to provide for an adequate distribution system for the waters of the San Carlos storage project as authorized by the act of Congress approved June 7, 1924, reimbursable as provided in said act of June 7, 1924, $150,000: *Provided*, That the unexpended balance of the appropriation for this purpose for the fiscal year 1927 shall remain available for the fiscal year 1928.

For continuing construction of the Coolidge Dam across the canyon of the Gila River near San Carlos, Ariz., as authorized by the act of June 7, 1924 (43 Stat. 475–476), and under the terms and conditions of, and reimbursable as provided in said act, $750,000: *Provided*, That the unexpended balance of the appropriations for this purpose for the fiscal year 1927 shall remain available for the fiscal 1928: *Provided further*, That consulting engineers may be employed by the Secretary of the Interior in the manner and under the terms provided in the act of March 18, 1926 (Public Law No. 50), for advice relating to the construction of said dam.

(*b*) *Executive orders.*—By fourteen Executive orders, the first of which was issued August 31, 1876, and the last, June 2, 1913, various tracts of land adjacent to the reservations were added thereto.

4. HISTORY

The Gila River Reservation is 7 to 25 miles in width and about 50 miles in length, along both sides of the Gila River in the central part of Arizona. The reservation as first established by the act of Feburary 28, 1859 (11 Stat. 401), contained 10,160 acres, which has been increased by various acts and Executive

orders, until at the present time it contains 371,422 acres of which 96,000 have been allotted to individual Indians, the balance being held as tribal lands.

The agency headquarters are located at Sacaton, and 4,575 Pima, Maricopa, and Papago Indians are carried on the allotment rolls as permanent residents of the reservation. There are in addition to the above about 1,000 nomadic Papago Indians who claim residence wherever they chance to pitch their tents.

The amount of land cultivated and cropped by the Indians during the last 10 years has varied greatly, about 18,000 acres in all having been cleared and cultivated and one-half to two-thirds of this amount irrigated each year. When the San Carlos project is completed, it is contemplated there will be approximately 40,000 acres of irrigable land under the project, within the boundaries of the Gila River Reservation. In addition to the land cultivated by the Indians there are 2,615 acres of allotted lands leased to white farmers. Of this amount 2,500 acres are leased to one company for a period of 10 years at an annual rental of $3 per acre. The balance is leased in several small tracts at a land rental of $10 per acre.

The Indians on the reservation have between five and six thousand head of cattle, all individually owned. There is no tribal herd. The Indians are using practically all of their range land, and no white men are allowed to graze cattle on the reservation. On account of the scarcity of water for irrigation purposes the Indians have not been able to secure enough income from their farming operations to provide their necessities. A number of them go into the neighboring farming communities to work, for a portion of the year.

The Florence-Casa Grande, or Gila River Valley irrigation project, now under construction, provides for the irrigation of Indian lands in the Gila River Reservation, which is located in Pinal and Maricopa Counties, Ariz., and of other lands adjoining this reservation. The reservation includes the lands on both sides of Gila River, from a point about 8 miles west of the town of Florence, to the junction of the Salt and Gila Rivers, a distance of about 50 miles, The other lands included in the project lie along the river to the east of the reservtion, and to the south of the reservation. Certain features of the project will serve both Indian and other lands.

The territory included in this reservation was acquired from Mexico; that lying north of the Gila River by the treaty of Guadalupe-Hidalgo in 1848; and that south of the river by the Gadsden purchase in 1854. The earliest Spanish travelers through this territory found the Indians irrigating and cultivating lands in this region, and found also the remains of buildings and irrigation works whose origin was even then unknown. This cultivation by Indians continued until the acquirement of this territory by the United States, and to the present time, some of the old Indian canals being still in use.

The act of February 28, 1859 (11 Stat. 401) provided for a survey of the lands occupied by the Pima and Maricopa Indians, and authorized and directed the President to set aside not to exceed 100 square miles for a reservation for the Pimas and Maricopas. The land surveyed consisted of the 100 square miles provided for and included all the lands then irrigated. The reservation has been enlarged from time to time by presidential proclamations until 1913, the present area being 371,422 acres.

From the creation of the reservation to 1903 the work done by the Government on irrigation in this territory consisted of repairs to the old Indian ditches.

Soon after the creation of the reservation white settlement began in the Gila Valley immediately above the reservation, as well as in the valleys higher up the stream in Arizona and New Mexico. This brought about a constantly increasing demand on the water supply, and since these settlements were all above the Indian reservations, the water supply for the Indians was seriously depleted.

In 1903 and 1904 an experimental well and pumping plant was put in at the Sacaton school farm.

In 1904 after the passage of the United States reclamation act (1902) a board of engineers from the United States Reclamation Service made a survey of the Indian reservation irrigation, and recommended the installation of 10 wells and pumps to supply water to the Indian lands, the 10 pumps to be operated with power from the Salt River project.

The Indian appropriation act of 1905 provided for the first extensive work for the irrigation of lands within the Indian reservation. The act appropriated $50,000 for the construction of an irrigation system, and limited the total cost to $540,000. During the next year a plan was submitted. This plan called for the construction of flood-water canals and the installation of the wells and pumps previously recommended. The carrying out of this plan was detailed to the

Reclamation Service, and the Santan Canal on the north side of the river, eight wells and pumping plants, and a canal for distributing pumped water were constructed. No diversion dam was provided for the flood-water canal, however. The flood-water canal, as constructed, was 9 miles in length and had a capacity of 300 second-feet. This canal and the wells and pumps were turned over to the Indian Service in 1913. The construction of a lateral system for distributing the water was begun in that year and was continued through 1914 and 1915. The lack of diversion works and flood damage have rendered the flood canal of little use to the present time (1927) although it is possible to rehabilitate it and utilize it in connection with the larger project now under construction. The wells and pumping plants have been and are still in use, and have proven fairly satisfactory.

At the same time that the canals on the north side of the river were being constructed, additional works were being built on the south side of the river, within the reservation. The Little Gila, a channel roughly paralleling the main stream and heading in the river near the eastern end of the reservation had been used as a canal from ancient times, but the heading had been washed out and the upper end of the channel had fallen into disuse, an inlet having been made below. The old channel was opened up and a new heading was installed. In 1914 and 91915, high floods damaged the heading and the upper end of the canal, putting it out of use, and a new channel was cut through from the main stream to the Little Gila; but no heading was put in. The Little Gila has remained in this condition to the present time, and the larger project now under construction will obviate the necessity of rehabilitating it.

In 1913 another small project called the agency project, designed to irrigate 2,000 acres between the Sacaton Agency and the main river, was constructed. This system has remained in use to the present time, when flood water is available.

Another canal, heading one mile east of the reservation, known as the Blackwater "B" line, was also built at this time, to water about 2,500 acres. The floods of 1914–1916 washed out the upper end of this canal, and it is not now in use.

At the same time, work on a much larger project, known as the Casa Blanca Canal project was undertaken. This was designed to cover 35,000 acres to the west of the other lands described. Water was to be diverted from the Little Gila near its lower end. A dam and headgates were built, and the canal was built for several miles, as were many miles of laterals. The floods which destroyed the headworks at the head of the Little Gila destroyed the headgates of the Casa Blanca Canal, and the canal system has remained in disuse since that time. It will be incorporated in the new system.

For many years there had been proposals for providing storage for the Gila River Valley at San Carlos. In 1912 Congress provided for a report on the San Carlos Dam, by a board of Army engineers, and continued making appropriations for such investigations for the year following. The board recommended an investigation of the water supply and titles thereto, and this was provided for in 1914. This report reviews the history of the proposal for the construction of the dam. The following statements are taken from that report. (House Doc. No. 791, 63d Cong., 2d sess.)

In 1896 the United States Geological Survey made an investigation and called attention to the need of storage to provide water for the Indians on the reservation. (Senate Doc. 27, 54th Cong., 2d sess.) In 1899 the United States Geological Survey published a report on the proposed dam (Water Supply Paper No. 33), and the construction of this dam under the reclamation act was discussed immediately on the passage of that act. However, it was considered as an alternative to the Roosevelt Dam, and the latter was decided upon.

In 1905 Mr. F. H. Newell submitted a report of a board of engineers, recommending that the idea of building this dam be abandoned (House Doc. No. 791, 63d Cong., 2d sess., p. 12), in favor of reservoirs further up the Gila. The board of Army engineers reported adversely on the upper reservoirs (p. 13).

From 1905 to 1912 there was a series of reports, favorable and adverse, and more or less contradictory.

In 1911 the water users proposed to organize an irrigation district to build the San Carlos Dam (p. 20), and the Florence-Casa Grande Canal, and a series of wells along the canal below Florence (p. 22).

The Board of Army Engineers considered the whole question of storage, diversion, and distribution, and suggested a diversion dam at the head of Santan Canal, or a canal from Florence dam to Sacaton. Board recommends (p. 64):

1. The San Carlos Dam be built.
2. A suit for the adjudication of water rights.

3. The taking of steps to prevent the acquirement of further rights.
4. If San Carlos Dam is not built, build a diversion dam on the reservation.

In 1916 Congress made the initial appropriation for the dam and bridge at Sacaton suggested by the Army board, at a total cost of not to exceed $200,000, and work on plans was begun in 1917. Bids were called for in 1919, but none came within the permissible cost. In the Indian appropriation bill for 1921 the limit was raised to $400,000. The construction of the dam was begun in 1923 under the $400,000 authorization. In May, 1924, an additional appropriation of $300,000 was secured. (Rept. 1925, p. 77.) Condition October 1, 1924, given. All concrete work on dam was completed June 30, 1925. The dam will act as a diversion dam for the Santan Canal, and will be connected with Indian canals below, but this has not been done in 1927. The work of connecting the dam with the Indian canal system is included in estimates for 1921. Cost of dam, $668,659.91, 1926. (Rept., p. 40.)

The same act (1916) that provided for the Sacaton Dam provided also for beginning construction on the Florence Dam, at an authorized cost of $175,000: "*Provided*, That said dam shall be constructed as a part of a project for the irrigation from the natural flow of the Gila River of Indian lands in Pinal River Indian Reservation and private and public lands in Pinal County, Ariz." This dam was built during the years 1918 to 1922.

The same act (1916) provided also for examinations and surveys for a canal system to distribute water from the Florence Dam to Indian and white lands, and for the negotiation of an agreement with the white owners as to the land to be irrigated, diversion of the water made available, and the cost of the works. The 1917 appropriation bill carried $75,000 for beginning construction on the canal system, and construction has continued to the present time. The system is not complete in 1927.

In 1924 (act of June 7, 1924), Congress provided for the building of the long-discussed dam at San Carlos, to provide storage for both Indian and white lands in the Gila Valley, the dam to be known as the Coolidge Dam. Construction on the dam began in 1927 and it is expected that it will be completed by June 30, 1929 The reservoir is expected to provide stored water for about 100,000 acres and this acreage is to be divided equally between Indian-owned and white-owned land.

The building of canals by white settlers in the vicinity of the Gila River Reservation began in 1864, several small canals being built in the period from 1864 to 1887. In 1887 the Florence Canal, heading above all the Indian ditches, was built to supply lands under old ditches on the south side of the river and in addition some 15,000 to 20,000 acres southwest of Florence, extending to Casa Grande. The company building the Florence Canal issued bonds and built the Picacho Reservoir. The company defaulted on its bonds in 1893, and since that time there has been a series of changes in ownership through defaults, tax sales, etc. In 1914 the area irrigated in the Florence-Casa Grande district was 7,563.4 acres. There were 12,217.7 acres that had previously been irrigated. Of this total area about 15,000 acres were included in the project outlined by the Board of Army Engineers.

5. LOCATION, TRANSPORTATION, AND MARKETS

Counties: Pinal and Maricopa.
Townships: 4 to 7 S., 1 N. to 5. S.
Ranges: 5 to 11 E.; 1 to 8 E.; G. & S. R. M., B. & M.
Longitude: 35° W.
Latitude: 33° N.
Railroads: Maricopa and Phoenix; Southern Pacific; Arizona and Eastern.
Highways and roads: Principal State highway, graded and gravelled, crosses the reservation for a distance of approximately 20 miles. There are approximately 26 miles of graded roads and 196 miles of unimproved roads within the boundaries of the reservation.
Cities and towns: Florence, population approximately 1,161, 7 miles east of east boundary; Sacaton; Casa Grande; Coolidge; Sacate.
Railway stations: Florence, Maricopa, Sacaton, Casa Grande, Coolidge, Olberg, Sacate.
Markets: Phoenix, local, and eastern.
Indian agency: Sacaton.
Project manager: Florence.

26465—30—PT 6——17

6. RESERVATION LANDS AND ALLOTMENTS

Area of reservation as originally established, 10,160 acres.
Area of reservation at present, 371,422 acres.

(*a*) *Area, classification and estimated value of individual Indian and tribal lands*

Classification	Acres	Per acre value	Total value
Irrigated	17,500	$200.00	$3,500,000.00
Irrigable	2,000	150.00	300,000.00
Proposed irrigable	45,000	100.00	4,300,000.00
Grazing land	205,000	3.00	615,000.00
Mountainous and waste	106,422	2.50	260,055.00
Mineral land	15,000	10.00	150,000.00
	371,422		9,125,055.00

(*b*) *Allotments.*—Allotments were made in 1914 and again in 1920, as provided by section 17 of the act of June 25, 1910 (36 Stat. 855). Each Indian, regardless of age or sex, was allotted 10 acres of agricultural and 10 acres of grazing land. The number and classification of the allotments made to date are as follows:

Classification	Number	Unit area	Total area
Irrigated	1,583	10	15,826
Irrigable	3,311	10	33,114
Grazing	4,706	10	47,060
	[1] 4,800	20	96,000

[1] 20 acres per Indian.

Four thousand eight hundred and ninety-four allotments aggregating 96,000 acres are now held under trust patent. No allotments are held under fee patent. No deceased Indian allotments have been sold to date. Approximately 3,632 original allottees are now living. The total number of Indians under the Pima Agency is 4,575, and there are 1,000 nomadic Papagoes on the reservation.

7. POPULATION AND INDIAN HEALTH CONDITIONS

Indian tribes: Pima, Maricopa, Papago

	1920	1925	1927
Maricopa	280	285	285
Pima	3,589	4,034	4,005
Papago	250	268	285
Resident Indians	4,389	4,587	5,575
Nomadic Papagoes	1,000	1,000	1,000
Number of Indians on reservation	5,389	5,587	5,575
Indian births	80	75	70
Indian deaths	70	87	77

Indians having tuberculosis	172
Indians having trachoma	300
Indians living in permanent homes	4,575
Full-blood Indians	4,575
Less than full blood	None.
Indians receiving rations	108

8. CLIMATE

Period covered by reliable records: 1876 to 1927.
Range in elevation of irrigable area: 1,100 to 1,500 feet.
Temperature: Maximum temperature 120°; minimum temperature 8° F. Average maximum temperature: 110°; average minimum temperature 8° F.

Average annual precipitation: Florence 9.74 inches (rain); San Carlos 12.31 inches (no snow).

Average date last killing frost (spring): April 1.

Average date first killing frost, (fall): November 15.

Growing season: 8½ months.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(*a*) *Topography.*—Topographic survey of irrigable area has been made. Topographic plan table survey on scale of 1,000 feet per inch, 5-foot contour intervals, 1915, C. R. Olberg, filed Los Angeles office.

Average slope of irrigable areas, 10 feet per mile.

Maximum slope of irrgable areas, 40 feet per mile.

Minimum slope of irrigable areas, 4 feet per mile.

Approximately half of the irrigable areas is uniform as to slope, and half is broken by isolated ridges or depressions.

Per acre cost of clearing, plowing, leveling, and ditching:

Smoothest lands of irrigable area	$35
Roughest lands of irrigable area	75
Average lands of irrigable area	50

(*b*) *Soil.*—Soil survey or irrigable area has been made by the United States Geological Survey. Lack of drainage stunts the crops in portions of the reservation longest under cultivation; tracts north of the river particularly show alkali deposits. Several hundred acres in small tracts over the entire reservation have been rendered unproductive by alkali or seepage. No drainage system has been constructed.

(*c*) *Irrigation methods and water delivery.*—The border method of irrigation is used on approximately 14,000 acres, Three to six second-feet constitute a head and is delivered on demand when water is available.

(*d*) *Duty of water.*—Lack of water has prevented any definite amount being used.

(*d*) *Principal crops and average crop production*

Crop		Yield	Value
Corn	bushels	31,192	$43,669
Wheat	do	99,440	149,160
Maize	do	14,947	14,947
Barley	do	9,240	9,240
Beans	do	2,555	5,599
Cotton	pounds	640,750	160,187
Oats	bushels	140	98
Alfalfa	tons	3,496	59,415
			442,315

10. WATER SUPPLY AND WATER RIGHTS

(*a*) *Source.*—Land now included in the Gila River Reservation has been irrigated by the Indians from the Gila River since long prior to the advent of the white man in Arizona. The drainage basin covers about 17,834 square miles, ranging in elevation from 1,000 to about 10,000 feet. The average elevation of the watershed is approximately 3,000 feet.

The maximum run-off recorded is 1,011,082 acre-feet in 1905. The minimum run-off recorded is 99,936 acre-feet in 1902. The mean run-off is about 470,000 acre-feet. The maximum discharge at diversion point is approximately 100,000 second-feet and the minimum is 0 second-feet. The mean discharge is about 180 second-feet. There are now no reservoirs from which the Indian lands may be irrigated but the Coolidge Dam now under construction and to be completed 1929, it is contemplated will provide storage for about 100,000 acres of Indian and white land.

(*b*) *Project diversions.*—There is no record of project diversions by months.

(*c*) *Water rights.*—The Pima Indians used water for irrigation purposes many years prior to the establishment of the reservation, but after white men began to settle along the upper reaches of the river and diverted water above the Indian lands, the quantity of water left for the use of these lands decreased year by

year until during the past few years the crops of the Indians have been reduced, some years to an almost total failure.

Several court decisions have been rendered in regard to the waters of the Gila River, as follows:

Adjudication suit George Lobb v. *Pete Avenente.*—On April 6, 1916, a decision was given in the case of George Lobb *v.* Pete Avenente, by the Supreme Court of the State of Arizona, in and for the county of Pinal, wherein the priority rights of certain lands in the Florence district to the use of water for irrigation purposes from the Gila River were established.

This decree was supplemented by a decision dated October 23, 1917, which established the priority rights to additional lands. While these lands do not lie within the limits of the Gila River Reservation they do lie within the limits of the San Carlos irrigation project.

Adjudication suit in the district court of the United States for an adjudication of water for Indian lands under the San Carlos project.—On October 3, 1925, a suit was filed in the district court of the United States in and for the district of Arizona for the purpose of securing an adjudication of water for the Gila River Reservation and other lands (Globe Equity No. E59).

In this suit upward of 400 defendants are named, the object of the suit being to determine the respective priorities of the various defendants and the United States in behalf of the Indians to the use of the waters of the Gila River and its tributaries.

Among other things set up in the bill of complaint are the following:

"For many years after white men came to settle along the Gila River in the vicinity of Florence, Ariz., which was about the year 1864, there were controversies as to the rights to the use of the water of said river between such white settlers as diverted waters there from above the Gila Indian Reservation at or near Florence, Ariz., and the Pima Indians. Under the act of May 18, 1916, which directed and authorized the Secretary of the Interior to undertake a project which has since come to be known as the Florence-Casa Grande project, and which has been heretofore referred to, if he should find the same to be feasible and should be able to make or provide for what he deemed to be a satisfactory settlement of water rights between the said white persons and the Indians. The water rights of the white persons of the Florence-Casa Grande Valley, with a few exceptions, were settled, and under an agreement which accompanied that settlement, the Florence-Casa Grande project was organized.

"As a part of that settlement, the United States contributed to that project as hereinabove stated, to the extent necessary, the water rights belonging to it on account of the Pima Indians, and the white persons contributed in their turn and conveyed to the United States their water rights: The result of this agreement is that the United States and its Indian wards, the Pima Indians, own to a certain extent, and are interested in the rights of these white persons and these white persons equitably own to a certain extent and are interested in the rights of the United States and of these Indians.

"As a part of this settlement and under the contract referred to, the white persons mentioned were required to form a water-users association, with the idea that it could and would represent the white land owners in said project in dealing with the Secretary of the Interior and with the United States with regard to said project.

"The Pima Indians, from time immemorial, have occupied and possessed lands on the Gila River Indian Reservation, which has an area of 371,422 acres. When the white men first visited those regions they found these Indians irrigating from the Gila River extensive areas of land and raising large crops by that method. The Pima Indians then numbered about as many persons as they do to-day which is approximately 5,000. They claimed a larger area of land along the Gila River than that now embodied in their said reservation, but later agreed with the United States to occupy their present boundaries.

" * * * The waters thus possessed by the Indians were a quantity sufficient to irrigate the lands subsequently allotted to them, as aforesaid, as irrigable allotments, said allotments being made to individuals among said Indians and amounting to 49,896 acres, and the waters so occupied amounted to 623 second-feet of waters of said river running continuously throughout the year but with a limitation for each year of 249,480 acre-feet of water. Such waters, to the extent thus far used for irrigation, have been diverted through numerous canals having their headings within said reservation, and now are to be diverted through the same canals and also by means of the Ashurst-Hayden Dam and the Sacaton

Dam; the priority of the right of said Indians and of the United States for and on account thereof, to said water, is of immemorial date.

"The United States on its acquisition from Mexico by the treaty Guadalupe Hidalgo and the Gadsden Purchase, of the territory within which were the lands occupied by the Pima Indians, became the owner of the soil of said territory with the exception of certain Spanish and Mexican grants heretofore made but which include no lands herein stated as contained in the * * * reservations referred to herein, * * *

"The United States, by a series of acts of Congress, proclamations, and executive orders, including the following:

"Act of February 28, 1859 (11 Stat. 401); Executive orders of date August 31, 1876; January 10, 1879; June 14, 1879; May 5, 1882; November 15, 1883; May 8, 1911; July 31, 1911; December 16, 1911; June 2, 1913; August 27, 1914; March 18, 1915; and July 19, 1915; recognized that the lands and waters above described as belonging to the Pima Indians under the title of occupancy and possession as aforesaid, belonged to them under said title, and the United States thereby confirmed and made more permanent those rights by reserving for said Indians the lands and water rights as aforesaid; the reservations thus made have been approved and ratified, confirmed and recognized, and the purposes connected with them have been carried out and are being carried out by numerous subsequent acts of Congress and the acts of the Executive thereunder.

"The water rights thus reserved were so much of the waters of the Gila River as should be needed to carry out the purposes of the United States in recognizing the aforesaid rights of occupancy and possession and in making said reservation and in accomplishing the civilization and bringing about the prosperity of said Indians, and otherwise carrying out the Indian policy of the United States with regard to them; the said rights amount to such quantities of water as shall be needed to irrigate the aforesaid irrigable allotments and amount to the same quantities of water as stated in the foregoing paragraph, to wit: 623 second feet of the waters of the Gila River running continuously throughout the year, but with a limitation for each year of 249,480 acre-feet of water.

"Said rights have an immemorial priority, if dated as this defendant submits they should be, as set forth aforesaid, and at any rate, have a priority as of the date of said first reservation, February 28, 1859.

"The Pima Indians from the time of the first knowledge of white men concerning them, and previous thereto, and for a time of which we have no record, and before any appropriations or uses of waters from the Gila River by white men, irrigated with the waters of the Gila River, lands now included in their said Reservation and cultivated crops upon them, through various canals and ditches, many of which ditches are, and even in ancient times were, of a large size. The lands so irrigated were of very considerable area. Said area was not less than 13,000 acres and not greater than 28,000 acres.

"Said Indians thus claim and are entitled to, as mere appropriators, with an immemorial priority, or at least a priority antedating those of all white persons, from 162.5 second-feet to 350 second-feet of water with a yearly limitation of from 65,000 acre-feet to 100,000 acre-feet.

"From the time of the first establishment of the Gila River Indian Reservation, as aforesaid, the United States, in support of its policy, have (among other acts) improved many of the old Indian canals and constructed new ones, including the building of the new Santan Canal on the north side of the river through the Reclamation Service in 1906, at an approximate cost of $500,000.

The construction of the Sacaton Dam, which cost $700,000.

The improvement of the Little Gila Canal at $19, 851.37.[1]

The Casa Blanca Canal project at a cost of $74,170.95.[1]

The Agency project at a cost of $38,112.74.[1]

The Blackwater project at a cost of $8,591.51.[1]

"The said were in many, if not all instances, accompanied and supported by posting and recording notices of appropriation and reservation, all or many of which have been set forth in the complaint herein. * * *

"Under the act of Congress of May 18, 1916, heretofore referred to, the United States, through the Secretary of the Interior, settled water rights between all but a few of the white land owners and water users of the Florence Casa Grande Valley and the United States on account of the Pima Indians, and undertook and established the Florence-Casa Grande project. That project is for the irrigation of at least 62,000 acres of land, with the idea that approximately 35,000 acres shall be Indian, and 27,000 acres white lands.

[1] Figures substituted in place of the ones used on the actual bill of complaint.

"The Ashurst-Hayden diversion dam, which is one of the structures of said project and is located about 10 miles above the town of Florence, was finished in the year 1922, and cost approximately $250,000. From said dam run the canals of the said project which takes the water to the Indian and white distributing systems thereof. The canals of said project have largely been completed and to date have cost approximately $750,000.

"The United States in furtherance of said project, on May 22, 1916, duly gave notice of appropriation and reservation of waters of the Gila River for said project by posting a notice at said dam site and recording the same, and otherwise; the amount of water claimed under said notice was 2,000 second-feet.

"The water rights owned by the United States for the benefit of said project and available for use in connection therewith, are so much of the rights above pleaded belonging to the United States on account of said Gila River Reservation, as are necessary or proper to use for the irrigation of the said project lands; the water rights reserved and appropriated especially for the said project, to the extent that the said water rights in connection with the other rights of the said project are needed therefor, and a large number of water rights formerly belonging to white persons whose lands were taken into the said project to the extent of 27,000 acres which were conveyed to the United States for said project purposes. The aggregate of such appropriations amount to 337.5 second-feet continuous flow, with limitation of 135,000 acre-feet per annum.

"Descriptions of the several tracts of land covered by the aforesaid rights are set forth in the order of the Secretary of the Interior made April 22, 1920, designating the white lands to be included in the Florence-Casa Grande project."

Buckeye (Benson-Allison) court decree.—Letter from the water commissioner, E. A. Stanford, dated June 6, 1926, states that water is delivered to the Maricopa Indians on the Gila River Reservation by virtue of the Buckeye (Benson-Allison) court decree. This decree was issued by the superior court of Maricopa County, State of Arizona, November 14, 1917. It provides for 48 miner's inches (later amended to read 80 miner's inches) constant flow to the quarter section of land.

Various lands are covered by this decree in the following townships: 1 N., 1 E.; 1 S., 2 W.; 1 S., 3 S.; 1 N., 1 W.; 1 N., 3 W.; 1 N., 2 E.; 1 S., 4 W.; 1 S., 5 W.; 1 N., 2 W.

A total of 1,080 acres of Indian lands are affected.

II. GENERAL PLAN OF IRRIGATION DEVELOPMENT

(*a*) *General plan.*—The San Carlos project contemplates the irrigation of about 45,000 acres of Indian-owned land and 55,000 acres of white-owned land.

The Coolidge Dam, located some 90 miles above the reservation on the Gila River, will act as a storage dam, providing a reservoir for catching and holding the flood waters. This dam will be completed in about two years' time. It will cost between $2,000,000 and $3,000,000.

The Ashurst-Hayden Dam, located about 10 miles up the Gila River from the town of Florence, will divert the normal flow of the Gila River and waters that may be released from the reservoir above into the Florence-Casa Grande Canal, which will then be distributed to the white lands between Florence and the east boundary of the reservation and to the Indian lands through the Pima lateral and various sublaterals.

A system of canals and laterals are now under construction, designed to distribute the water to the various sections of the reservation.

As the project now stands (September, 1927) it consists of the following features: The completed diversion dam above Florence, known as the Ashurst-Hayden Dam; a diversion canal from this dam carrying water for both Indian and white lands not yet completed; a diversion dam on the Indian reservation for Indian lands only that is completed; a diversion canal from the north end of this dam on the north side of the river, built several years ago and but little used and in need of rehabilitation; a series of wells and pumping plants under the canal just mentioned, and the lateral system necessary for distributing the pumped water; a partially completed canal system on the south side of the river that is to be connected with the Sacaton diversion, but not so connected as yet. This whole system was designed without reference to the San Carlos Reservoir, but can be used to distribute the stored water, and will be incorporated in the larger project.

The work remaining to be done consists of the construction of the Coolidge Dam; the completion of the main canal; the completion of the Pima lateral carrying water from the main canal to Indian lands, and sublaterals for distributing the water from the Pima lateral, connecting the south side canals with the

Sacaton Dam; rehabilitation and extending the south side canal system to supply the additional lands that will be served by the larger project; the designing and building of a canal for supplying lands on the north side of the river for lands between the Ashurst-Hayden Dam to the east line of the reservation; the installation of drains as they become necessary.

(*b*) *Divisions or units of project.*—The project is divided into a number of units, as follows: Sacaton unit, Little Gila unit, Black Water unit, Casa Blanca unit, Sacaton Flats unit, Agency unit, and Lower Gila unit.

(*c*) *Present condition of project.*—

	Acres
Estimated irrigable area of project as proposed:	
White lands	55, 000
Indian lands	45, 000
Area that can now be irrigated	16, 000
Area now actually irrigated	14, 420
Total cost to date	$3, 834, 852. 50
Per acre cost to date	$80
Estimated per acre cost when completed	$80
Per cent of project construction now completed	25

(*d*) *Construction work yet to be done—principal features.*—

Coolidge Dam	$2, 500, 000
Completion of canal system	1, 500, 000

12. SUMMARY OF PROJECT WORKS

(*a*) *Storage.*—No storage reservoirs have been built.

(*b*) *Canals.*—

Capacity:	Miles
1,000 second-feet or more	9. 00
500 to 1,000 second-feet	29. 49
250 to 500 second-feet	8. 78
100 to 250 second-feet	2. 00
50 to 100 second-feet	2. 08
15 to 50 second-feet	4. 79
Less than 15 second-feet	1. 79
Total	47. 93

Sacaton Canal and dikes, road and levee included, under Sacaton Dam

Total excavation, all units:		
Class 4, cubic yards	45, 143	$34, 482. 00
Class 3, cubic yards	1, 972	$2, 636. 00
Class 2, cubic yards	87, 738	$47, 821. 87
Class 1, cubic yards	1, 409, 136	$297, 031. 35
Grand total excavation	1, 543, 989	$363, 971. 22
Grand total mileage		51. 48

(*c*) *Structures.*—

15 spillways, 17,049 cubic yards excavation	$2, 235. 10
80 concrete structures, head gates, flumes, bridges, turnouts, etc	359, 057. 74

(*d*) *Diversions.*—Two diversion structures have been constructed.

Ashurst-Hayden Dam.—This diversion dam contains 9,054 cubic yards of concrete, and the dikes contain 10,709 cubic yards of masonry, and 4,655 square yards riprap; cost, $244,004.83.

Sacaton Dam.—Length, 1,250 feet, with dikes, 4,110 feet in length. Dikes contain 85,000 cubic yards dirt, faced with riprap, and dam proper contains 18,102 cubic yards reinforced concrete; cost $719,793.21.

(*e*) *Drains.*—0.43 mile, 300 second-feet.

(*f*) *Project telephone system.*—

Number miles telephone line	10
Number telephone stations	2

13. AREA AND UTILIZATION OF IRRIGABLE LANDS

Acreage arable	100,000
Indian owned	45,000
White owned	55,000
(Outside reservation.)	
Acreage irrigable	16,000
Acreage irrigable, Indian owned	16,000
Irrigated (all by Indians):	
1924	13,326
1925	13,320
1926	14,422
Indians farming (1926)	676
Total value Indian crops (1925)	$235,355.75
Average acre crop value (1925)	$24.43
Lessees farming (1926) (this area not under project)	5
Total value lessees' crops (1925)	$67,144.20
Average acre crop value (1925)	$37.50
Acreage irrigated by lessees (1926)	2,615

14. PRINCIPAL CROPS, CROP YIELDS, AND RETURNS

Florence-Casa Grande Project

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre	Total value
White farmers, 1925:					
Alfalfa	90	4 tons	$20.00	$80.00	$7,200.00
Barley hay	20	3 tons	12.00	36.00	7,200.00
Cotton, short staple	1,700	1.4 bushels	32.50	46.50	79,050.00
	1,810			47.80	86,970.00
Indian farmers, 1925:					
Alfalfa	538	2.53 tons	20.00	54.78	29,472.00
Barley	662	19.46 bushels	1.00	19.46	12,880.00
Beans	190	22.33 bushels	2.50	55.83	10,607.00
Corn	1,113	15 bushels	1.25	18.75	20,868.75
Cotton, long staple	642	0.332 bale	120.00	40.00	25,680.00
Cotton, short staple	820	0.468 bale	32.50	15.21	12,472.20
Forage	680	1.79 tons	10.00	17.90	12,200.00
Maize	760	2.17 tons	15.00	37.00	26,750.00
Wheat	4,850	15.98 bushels	1.20	19.18	93,000.00
Miscellaneous	170			26.11	4,440.06
	10,424			22.60	235,355.75

15. Economic conditions among project farmers

	1924	1925	1926
1. Number of Indians on farms	600	680	676
2. Indian families farming	600	680	676
3. Livestock, value	$326,082.00	$246,296.00	$215,400.00
Horses	8,750.00	5,330.00	5,000.00
Cattle, beef	4,820.00	6,470.00	5,000.00
Cattle, dairy		168,000.00	100.00
Sheep	4	10	
Hogs	319	463	450
4. Estimated value livestock per farm			$190.00
5. Equipment, plows	$70,000.00	$70,255.00	$78,208.00
6. Estimated value equipment per farm	$116.66	$103.00	$116.00
7. Acreage farmed by Indians	12,000	12,000	14,422
8. Acreage farmed per family	20	19.1	21.3
9. Average crop value per acre	$37.30	$24.43	$17.44
10. Average crop value per family		514.71	372.00
11. Acreage Indian land leased: Irrigated	2,500	2,500	2,615
12. Average rental per acre:			
Irrigated			(1)
Not irrigated			(2)

[1] $10 on 115 acres. [2] $3 on 2,500 acres.

15. Economic conditions among project farmers—Continued

	1925	1926	1927
13. Number of Indians receiving payments from timber, agriculture, grazing, oil, and mineral leases and power	260	300	300
14. Indian incomes fiscal year 1927:			
Tribal:			
Mineral leases			$186.26
Miscellaneous			975.00
Individual:			
Grazing leases			8,350.00
Crops raised			251,493.00
Livestock, poultry, etc			8,972.00
Native industries			2,200.00
Wages and salaries			26,895.62
Issued gratis			2,544.20
Total incomes			311,616.08
15. Average per capita payment from above sources			27.83
16. Average total payment to Indians from above sources:			
Tribal			1,161.26
Individual			8,350.00
17. Indian reimbursement indebtedness:			
Individual [3]	$24,465.44	$17,519.81	17,359.81
Tribal [3]	6,631.63	6,631.63	6,631.63
18. Amount paid on reimbursable indebtedness			23,991.44
19. Number of Indians receiving rations	102	108	
20. Value of rations		$2,544.20	
21. Indian tribal fund (amount)		$6,631.63	2,093.00
22. Source of tribal fund [4]			

[3] Does not include cost of irrigation works. [4] Mineral leases and timber sales.

16. PROJECT OPERATION AND MAINTENANCE

(*a*) *Organization.*—Two Indian ditch riders are employed during the entire year at $75 each per month in the Santan and Maricopa Districts, which comprise about 5,000 acres. The Indians furnish their own horses.

(*b*) *Annual expense.*—Operation and maintenance expenditures amounting to about $15,000 per year are for canal patrol and pump operation of 10 wells. The total operation and maintenance expenditure for the fiscal year 1926 was $12,027.62 and for 1927, $12,632.50.

(*c*) *Comparison with neighboring projects*

	Gila River	Salt River	Yuma
Elevation (feet)	930 to 1,405	900 to 1,300	0 to 300.
Growing season	April to November	April to November	January to December.
Soil	River silt; mountain wash	Heavy adobe; loose and sandy wash.	River silt.
Water supply	Periodical	Storage; perpetual	Canal diversion; perpetual.

Crops grown—Salt River project, Arizona.—This project irrigates 203,527 acres of land of the shareholders of the Salt River Valley Water Users' Association and 24,998 acres on a rental basis and under the Warren Act, all located in the Salt River Valley, Maricopa County, Ariz.

The range of temperature over a period 35 years was from 22° to 117°, with an average annual rainfall of 8.34 inches. The soil varies from sandy to silt and clay loam of great fertility. Farming is highly diversified, the climate permitting cultivation during the entire year. The major crops are cotton, alfalfa, grain, citrus and deciduous fruits, vegetables cantaloupes, grapes and small fruits, and dairy products. Local, Pacific coast, and eastern markets absorb the surplus products.

From 2.6 acre-feet to 4.2 acre-feet of water per care are required for irrigation.

The Yuma project in California and Arizona.—The Yuma project, exclusive of the Mesa division, comprises 65,000 acres of irrigable land for a distance of 38 miles from the boundary between Arizona and Mexico, in Yuma County, Ariz.,

and Imperial County, Calif. The soils are rich alluvium bottom land. The principal crops are cotton and alfalfa. The irrigation season is 365 days. The average temperatures for 29 years are: High, 115°; low, 28°F.; rainfall, 40-year average, 3.1 inches.

The Mesa division comprises 45,000 acres of mesa land lying about 80 feet above the valley. The soil is sandy and the climate frostless and well-adapted to the growing of citrus and other semitropical fruits.

The climate and soil of these two projects are very similar to those of the Gila River Reservation, particularly the Salt River project, which practically joins the Gila River Reservation. Several tables are given below, showing acres cultivated, crops raised, and yields per acre on these two projects, for purposes of comparison with such farming as has been done on the Gila River project.

	Salt River, Ariz.		Yuma, Calif.		Gila River reservation, 1925
	1925	1926	1925	1926	
Barley	9,507	5,461	75	212	662
Corn			51	8	1,113
Wheat	6,254	15,812	509	499	4,860
Alfalfa seed			11,507	12,457	
Alfalfa hay	65,368	60,413	17,512	16,414	628
Other hay	4,513	12,305	10,086	255	840
Other forage	10,589	10,688		14,806	680
Pasture	42,945	52,985	1,922	4,416	
Beans	311	318			190
Truck and miscellaneous	10,830	16,551	2,101	1,743	1,087
Citrus fruit	2,228	2,297	9	1	
Small fruit	1,328	1,018	20	64	
Cotton:					
Short staple					2,520
Long staple	107,598	82,780	32,240	34,408	642
Miscellaneous fruit	1,573	1,913	117	136	108
Total	263,144	262,543	76,149	85,419	13,320
Double-cropped	47,714	43,643	23,029	28,649	
Net acres cropped	215,430	218,900	53,120	56,770	13,320

Per cent of irrigable area cultivated to total irrigable area:

Salt River, Ariz	91
Yuma, Calif	48.4
Gila River Reservation	27.6

Irrigation on Gila River Reservation, Ariz.

Per acre value	Salt River Reservation		Yuma, Calif.		Giles River Reservation
	1925	1926	1925	1926	1925
Barley	$31.30	$33.20	$23.65	$15.70	$19.46
Corn			38.00	39.60	18.75
Wheat	36.58	50.30	21.00	22.10	19.18
Alfalfa seed			49.80	46.00	
Alfalfa hay	73.90	87.75	36.60	36.40	54.78
Beans	45.00	42.00			55.82
Truck	311.00	313.00	197.30	116.30	
Citrus fruit	382.10	404.55	23.33	68.00	
Small fruit	286.00	409.00	5.00	54.80	
Cotton:					
Short staple					36.42
Long staple	98.00	107.40	92.80	91.60	40.00
Miscellaneous fruit	224.50	181.50	199.00	71.90	
Average acre value	104.50	101.80	88.60	71.80	26.34
Total value	22,456,640.00	22,091,850.00	4,718,845.00	4,504,090.00	322,325.75

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(a) *Construction cost to June 30, 1927*

Ashurst-Hayden Dam	$244,004.83
Coolidge Dam	697,428.73
Pima Agency irrigation unit	38,134.01
Blackwater unit	8,605.95
Casa Blanca unit	74,214.16
Miscellaneous construction	21,430.07
Gila River canal system	956,883.51
Gila River investigations	3,103.93
Gila River surveys	40,783.40
Gila River undistributed	69,353.96
Little Gila unit	19,872.31
Lower Gila unit	3,618.10
Sacaton unit	452,127.21
Sacaton Bridge and Dam	713,066.99
Sacaton Flats	790.22
Pima irrigation unit	12,549.93
Salt River power payments	100,000.00
Total construction costs	3,455,957.31
Inventories on hand	113,249.27
Total expenditures	3,569,217.64
Estimated cost to complete 100,000 acres, the total proposed ultimate area 100,000	6,257,482.00
Present construction cost for 18,000 acres	3,450,000.00
Estimated per acre cost when completed	110.00
Per acre value of land without irrigation	20.00
Per acre value of land when irrigated	150.00
Increased per acre value by irrigation	130.00

(b) No construction assessments or collections have been made.

(c) *Operation and maintenance cost to June 30, 1927*

Pima Agency unit	$3,931.90
Blackwater unit	2,139.13
Casa Blanca unit	3,321.28
Little Gila unit	1,325.59
Sacaton unit	20,991.40
Sacaton Bridge and Dam	6,718.72
Pima irrigation unit	79,200.44
Total operation and maintenance costs	117,628.46

(d) No operation and maintenance assessments or collections have been made.

18. GENERAL DISCUSSION OF PROJECT PROBLEMS

Review of irrigation and agriculture by Indians.—Irrigation in southern Arizona dates back many centuries. The old remnants of canals can be plainly traced along both the Gila and Salt Rivers. The early Spanish travelers and missionaries found the Indians farming a considerable area along the Gila River in much the same locality that they are attempting to farm to-day. Shortly before the United States acquired this territory by the treaty of Guadalupe Hidalgo, General Kearney's troops in passing through this section found large areas under cultivation. This was described by Lieutenant Colonel Emory, an attaché to Kearney's command, writing under date of November 11, 1846, as follows:

"The camp of my party was pitched on the side nearest town and we saw the first of these people (the Pimas). They were perfectly frank and unsuspicious. Many would leave their packs in our camp for hours; theft seemed to be unknown among them. We were at once impressed with the beauty and order and disposition of the arrangements for irrigating and draining the land. To us it was a rare sight to be thrown in the midst of a large nation of what are termed wild Indians, surpassing many of the Christian nations in agriculture, little behind them in arts, and immeasurably before them in honesty and virtue. On November 12, we traveled 15½ miles and encamped on the dividing ground between

the Pimas and Maricopas. For the whole distance we passed through cultivated grounds over a luxuriantly rich soil. The bed of the Gila opposite the village is said to be dry, the whole water being drawn off by the acequias of the Pimas for irrigation, but the ditches are larger than are necessary for this purpose and the water which is not used returns to the bed of the river with little apparent dimunition of its volume." (Report of a military reconnaissance made in 1846–47, by Lieut. Col. W. H. Emory, Mississippi to Pacific Ocean Survey Report, Ex. Doc. 78, 33d Cong., 2d sess.)

Six years later (1852), J. R. Bartlett, the American commissioner of the Mexican Boundary Survey, describes the irrigation of the Gila River as follows:

"The dryness of the river was produced by the water having been turned off by the Indians to irrigate their lands, for which the whole stream seemed barely sufficient. It is probable, however, that with more economical management it might be made to go much farther.

"The valley or bottom land occupied by the Pimas and Coco-Maricopas extends about 15 miles along the south side of the Gila and is from 2 to 4 miles in width, nearly the whole being occupied by their villages and cultivated fields. The Pimas occupy the eastern portion. There is no dividing line between them nor anything to distinguish the villages of one from the other. The whole of this plain is intersected by irrigating canals from the Gila, by which they are enabled to control the waters and raise the most luxuriant crops. At the western end of the valley is a rich tract of grass, where we had our encampment. This is a mile or more from the nearest village of the Coco-Maricopas. On the northern side of the river there is less bottom land and the irrigation is more difficult. There are a few cultivated spots here; but it is too much exposed to the attacks of their enemies for either tribe to reside upon it.

"The villages consist of groups of from 20 to 50 habitations, surrounded by gardens and cultivated fields, intersected in every direction by acquias, which lead the water from the Gila. Their mode of irrigation is the same as that practiced in various parts of Mexico. Their cultivated fields are generally fenced with crooked stakes, wattled with brush, the thorny mesquite predominating; although I noticed large patches of wheat, a long distance from any village, that were not inclosed.

"They plow but little, finding their hoes quite sufficient for turning up the light soil. When plowing is resorted to, oxen alone are used. They possess a few carts and wagons, obtained from emigrants, which they use with oxen for agricultural purposes.

"I have not cited the agriculture of these tribes as superior to that of all other Indians; although I may be safe is saying that the system is more extensively and methodically practiced than elsewhere. The Yumas, and other tribes on the Colorado, irrigate their lands and raise wheat, corn, melons, etc. The Moquis and the Navajos, who are more nomadic in their habits than any tribe west of the Rocky Mountains, raise corn when driven to extremities. But the Pimas and Coco-Maricopas have made agriculture more of a system. Their lands are better irrigated, their crops are larger, and the flour which they make from their wheat and maize is quite as good as the Mexicans make, except in their gristmills."

With the discovery of gold in California, white travelers and adventurers made their way through this country and later with the establishment of the overland stage route from El Paso to the Pacific passing through these Indian villages, the Indians were furnished a market for some of their surplus agricultural products. In 1858 G. Bailey, special agent of the Indian Department, quoting from a report of Lieutenant Chapman, states:

"Their pueblos (Pimas) extend along this stream (the Gila) some 15 miles, and some of them at a distance from the river proper of more than 5 miles, these being supplied with water by acequias. This village occupied by the Pimas and Maricopas is to a great extent cultivated, and I have never seen richer soil or more beautiful fields. The acequias of crystal water running from pueblo to pueblo all over the valley makes it present an appearance of beauty and civilization that is truly pleasing. The principal products of their labors are corn, wheat, pumpkins, beans, peas, melons, etc. They are a barrier between the Apaches and all western Arizona and while their present relations continue, travel between Fort Yuma and the Maricopa Wells will be as safe as in settlements."

After the Gadsden Purchase of 1853 it began to be recognized that one of the feasible routes for a transcontinental railroad lay to the south of the Gila River, and the westward drift of the white settler had preceded the actual building of the Southern Pacific railroad in 1878. The whites settled along the streams and began diverting the waters of the Gila River above the Indian canals as early as 1873.

These diversions by the whites continued to increase until in the latter part of the nineties the entire flow of the Gila River had been diverted on to new lands and the Indians on the Gila River Reservation were deprived of much of the water that they formerly used.

There is apparently no definite information as to the exact acreage that may have been under cultivation by the Indians at the time white men first began to travel through this country. From the description of the early travelers we may assume that it was of considerable magnitude. By some it is described as a cultivated tract 15 miles in length and more than 5 miles wide.

The Gila is a very flashy stream, sometimes being nearly dry and at others a raging torrent cutting and tearing down its low banks. In this way the stream has a wide of meandering back and forth in its low, flat valley. Undoubtedly the stream has cut away considerable acreage that was formerly cultivated by the Indians so that all traces of its use have been obliterated. A survey made in 1914 of the acreage then under cultivation and acreage where signs were still apparent or where they were apparent at the time of a former survey in 1904, showed more than 26,000 acres that had been cultivated in the not distant past. With what must have been destroyed by the meandering of the Gila River it seems safe to assume that not less than 28,000 acres of land had been cultivated by the Indians prior to the encroachment of the white man upon the waters of the stream. During the past 10 years the area under cultivation has probably not exceeded 17,000 acres and because of the uncertainty of the water supply due to diversion on the upper stretches of the stream the production is very uncertain upon the whole cultivated area. The acreage in cultivation on other portions of the drainage basin above were estimated in 1914 to amount to 33,000 acres.

The Florence Casa Grande, San Carlos unit.—The unit known as the Florence Casa Grande, San Carlos, consists of the construction of the high dam now known as Coolidge Dam, in the Box Canyon of the Gila River creating a large storage reservoir of 1,194,000 acre-feet capacity known as the San Carlos Reservoir. The reservoir site covers a considerable acreage of bottom lands on Gila River of the San Carlos Reservation. The water from the reservoir is to be carried down the Gila River and diverted at the Ashurst-Hayden and Sacaton Dams to Indian lands on the Gila River Indian Reservation and to private lands around and adjacent to Florence and Casa Grande. The project is situated in central southern Arizona on the main line of the Southern Pacific Railroad via Maricopa and the new main line via Phoenix. It is 450 miles east of Los Angeles, its nearest large consuming market.

Rights of Indian lands to water from San Carlos Reservoir.—The act providing for the construction of a dam across the canyon of the Gila river near San Carlos, Ariz., provides, "That the total cost of the project shall be distributed equally per acre among the lands in Indian ownership and the lands in public or private ownership that can be served from the waters impounded by said dam. * * * That the construction charges assessed against the Indian lands shall be reimbursable to the Treasury of the United States on a per acre basis under such rules and regulations as the Secretary of the Interior may prescribe, and there is hereby created a lien against all such lands, which lien shall be recited in any patent issued therefor, prior to the reimbursement of the total amount chargeable against such land."

With the development of irrigation on other parts of the drainage basin of the Gila River by white men there has been a gradual depletion of the water supply available for the Indian lands.

In 1914 there were 33,000 acres under cultivation in the Solomonville Safford Valley, Duncan Valley, and the Wenkelman section. Some of these diversions began as early as 1873.

The acreage that was formerly irrigated by the Indians is somewhat uncertain, but it would appear that at one time there has been an area of approximately 28,000 acres that has been irrigated. The traces of old canals, laterals, and other signs of reclamation still may be found upon the ground. Within the past 10 years 18,000 acres have been under cultivation, probably not over two-thirds of it at one time.

The Government as guardian of the Indians has taken no effective steps to protect the rights of the Indians to the waters of the stream to which it would seem they were justly entitled by the prior right of use upon a considerable acreage.

In the meantime the white settler has established property rights of long standing based upon the use of these same waters that have destroyed the Indians' property values. This has been a gradual encroachment during 50 years

and the Government has permitted these rights to accrue without affirmative protest.

The construction of the San Carlos Reservoir is for the purpose of furnishing water in part to the same lands that the Indian formerly irrigated by direct flow from the Gila River. Had the Government taken the proper steps to protect these Indian water rights as guardian of the Indians, it would not now be necessary to build the San Carlos Reservoir to furnish the Indian lands a water right, at least to the extent of the water necessary for the 28,000 acres of land heretofore irrigated. While the Gila always has been a flashy stream, there occurs no question that the Indians successfully irrigated a large acreage prior to the whites settling on the stream. The reservoir may furnish a more dependable supply, but is no justification for charging lands formerly irrigated with the full per acre cost of reservoir.

To now apportion the cost of the construction of the San Carlos Reservoir to all the Indian lands and make the same reimbursable to the United States does not appear to be equitable.

Your advisers believe it was the duty of the Government to protect the water rights of the Indians to at least 28,000 acres and in not doing so the Indians have suffered great damage. Through the neglect to protect these rights, white settlers on other parts of the watershed have developed property rights of great value depending upon the use of this water in which they have a moral, if not legal right after many years of industrial use. It is now the duty of the Government to furnish the Indian lands a free water right from the San Carlos Reservoir to the extent at least of 28,000 acres. Such a precedure is not without precedent. On the Wapato project, Wash., the Government purchased sufficient reservoir water to give the main canal 730 second-feet continuous flow instead of 147 second-feet, as provided for in the act of August 1, 1914 (38 Stat. 604), in which it was stated "That the Indians of the Yakima Reservation in the State of Washington have been unjustly defrauded of the portion of the natural flow of the Yakima River to which they are equitably entitled for the purpose of irrigation, having only been allowed 147 cubic feet per second, the Secretary of the Interior is hereby authorized and directed to furnish at the northern boundary of the said Yakima Indian Reservation, in perpetuity, enough water, in addition to the 147 cubic feet per second heretofore allotted to said Indians, so that there shall be, during the low-water irrigation season, at least 720 cubic feet per second of water available when needed for irrigation, this quantity being considered as equivalent to and in satisfaction of the rights of the Indians in the low-water flow of Yakima River * * * "and there is hereby authorized to be appropriated the sum of $635,000 to pay for said water to be carried into the reclamation fund * * *."

Somewhat similar conditions as to the use of the waters of the streams by white settlers from which Indian lands must be served have arisen on the Walker River in Nevada, and on the Pine River in southwestern Colorado.

Under the principles laid down in the Winters Decision, the Government would be entitled to sufficient water from the Gila River to irrigate properly the Indian allotments.

Water supply.—The Gila River has a drainage area of 17,834 square miles above the point of diversion, with an elevation of 1,000 to 10,000 feet. It is a stream of wide range of discharge, both seasonal and year to year. The minimum run-off at San Carlos is 63,906 acre-feet and the maximum 1,589,800 acre-feet, with an average of 405,505 acre-feet. The flow of the river may vary from 0 to 100,000 second-feet.

Assistant Chief Engineer C. R. Olberg, in a report on the Coolidge Dam, dated November, 1925, assumes that there is sufficient run-off in the Gila River, if stored in a reservoir at the San Carlos site, of a capacity of 1,194,950 acre-feet, to irrigate 80,600 acres requiring an annual draft of 320,000 acre-feet per annum when fully developed, or four acre feet per acre, which he estimated would deliver three acre-feet per acre to the land. In his set-up, beginning in 1895 and reaching full development in 1905, there remain in the San Carlos Reservoir 153,130 acre feet in storage with the close of December, 1924. There had been no surplus water to waste over the spillway since March, 1917, and in the approximate eight years between the two latter dates, the reservoir capacity was reduced 122,890 acre feet by silting in of the reservoir. If another like period of run-off should occur the close of the period would show but 30,240 acre feet in storage.

The total inflow into the reservoir from April 1, 1917, to December 31, 1924, was 2,113,400 acre-feet, which was greater than the inflow for a like period of time between April 1, 1897, and December 31, 1904, by 560,920 acre feet. It is there-

fore evident that if the next period of shortage should be as severe as that existing between April 1, 1897, and December 31, 1904, there would be a shortage of around 500,000 acre-feet to make up by pumping to provide an ample water supply for the 80,000 acres.

During the period April 1, 1897, to December 31, 1904, the discharge of the Gila as shown by the discharge measurements at San Carlos was depleted by the irrigation of land above, which was estimated by the Army Board report in 1914 to consist of 25,000 acres near Safford and 7,000 near Guthrie (Par. 182, Army Board Report) or a total of 32,000 acres. There is no definite information of the acreage under irrigation during the period 1897 to 1904, but it was probably less than that shown in 1914. In 1925, the Olberg report give 7,000 acres irrigated in the Duncan Valley and 32,000 acres in the Solomonville Valley or a total of 39,000 acres, an increase of 7,000 acres over the 1914 estimate.

If we assume that the Gila River discharge at San Carlos will in the future be further depleted by the water required for 7,000 additional acres above the reservoir is two acre-feet per annum, we should have a further shortage of 112,000 acre-feet, if a period of short years should come such as existed between April 1, 1897, to December 31, 1904. This would give a total shortage of 600,000 acre-feet in round figures to be supplied by the reservoir. At the beginning of this period naturally no pumping from the ground waters would be resorted to, and it would be a fair assumption that this amount would be necessary during the last three or four years of the low period of run-off above considered, or 150,000 to 200,000 acre-feet per annum, in order to furnish a complete water supply.

In the Olberg report it is assumed that pumping will be necessary over a portion of the project in order to keep the land from water logging and that this water can be used for the irrigation of 20,000 acres of additional lands, making a project of 100,000 acres. It appears to your advisers that to consider building a project of 100,000 acres and contracting with white settlers on this basis of calculations is, to say the least, inviting a repetition of cheating the Indian lands of a sufficient water supply.

It is appreciated that the legislation for the construction of the San Carlos Reservation attempts to provide protection for the water rights of the Indian lands in the following language: "For the purpose, first, of providing water for the irrigation of lands allotted to Pima Indians on the Gila River Reservation, Ariz., now without an adequate supply of water, and second, for the irrigation of such other lands in public or private ownership as in the opinion of the said secretary can be served with water impounded by said dam without diminishing the supply necessary for said Indian lands."

If it is assumed that 55,000 acres are Indian lands and 45,000 acres are white settlers' lands, making up the total of 100,000 acres of the project, and if contracts are entered into with the white land owners to pay 45 per cent of the cost of the reservoir, the white owners will undoubtedly be entitled to the percentage of the water in the reservoir represented by their interest purchased.

It would seem from the above that it was unwise to estimate a project in excess of 80,000 total, 50,000 acres Indian and 30,000 acres private lands, a portion of which would, in years of excess drouth, require supplementing by pumping from the ground waters. With a project of 80,000 acres there would be an opportunity to supplement the water supply by using the drainage waters as they develop and thus create a reserve of stored water to take care of the long periods of low years when they come. It must be remembered that the Indians are not as economical in the use of water as white farmers.

To contract now to sell rights in the San Carlos Reservoir to the amount under consideration by the bureau will be to repeat to a certain extent the mistakes in the past. The Indian lands will have only a partial supply of water.

Soil.—No soil surveys have been made of the project. Prof. R. H. Forbes states: "In general, the soils of the Casa Grande Valley are exceedingly well graded naturally, entailing minimum expense in leveling for irrigation. They range in physical character from gravelly loams, at the higher elevation to somewhat heavy clays, usually in the valley bottom. * * * In a general way it may be stated that in physical disposition and character the soils of the Casa Grande Valley resembles those of the Salt River Valley."

Irrigation methods.—The border method of irrigation has been practiced on the land now under cultivation. This method or the basin method are in general use in the Southwest and it is likely that either one or the other of these methods or a combination of both will be used on most of these lands. Large heads of water are usually employed with these methods. This requires a greater expense for preparation than some of the other methods, but it usually pays and assures

a more thorough irrigation and more even penetration of the water over the entire area.

Topography.—The general slope of the project is to the northwest or west. The white-owned portion of the project consists in the main of land having a very uniform slope and rather smooth. The Indian lands are rougher and the slopes are not so uniform, except that portion under the Santan Canal.

A topographic survey was made in 1915 on a scale of 1,000 feet to the inch showing five contour intervals. The average slope is about 10 feet per mile. No land classification has been made.

Irrigation plan.—As has been pointed out, a considerable acreage of Indian lands has been under cultivation for a great many years. In order to bring all the irrigable lands in the reservation under water it has been necessary to reconstruct the entire system. The Gila River is a broad, sandy, meandering stream and it is impracticable to maintain a number of canal headings with any degree of satisfaction or economy. The present system consists of the San Carlos Reservoir, where the Coolidge Dam is now under construction, and two main diversion dams. The first known as the Ashurst-Hayden Dam above Florence, where the Florence Casa Grande Canal heads. This canal furnishes water for all the lands on the south side of the river. The second dam is known as the Sacaton Dam and diverts water for the Santan Canal for the irrigation of lands on the north side of the river. The Florence-Casa Grande Canal diverts water for both Indian and white-owned lands. At a point 5 or 6 miles southeast of Florence the Pima lateral is taken out, which carries all the water for the Indian lands on the south side of the river, and will supplement the water supply for the Santan Canal by carrying the water across the river in a concrete aqueduct built as a part of the Sacaton Dam.

This lateral will also serve white-owned lands along the first 11 or 12 miles. The Florence Casa Grande Canal below the point of outtake of the Pima lateral will serve only white-owned land to a point west of Casa Grande. This canal will also serve a small body of land on the north side of the river north and west of Florence by a siphon across the Gila River. The Santan Canal serves only Indian lands and was originally built by the Bureau of Reclamation more than 20 years ago as a flood-water proposition, but has been of little use up to the present time due to diversion difficulties and lack of a water supply. The present status of the system is that the Coolidge Dam is under construction, contracts calling for completion by June 30, 1929. The two diversion dams were completed several years ago. The Florence-Casa Grande Canal is completed to a point 3 or 4 miles below the outtake of the Pima lateral. The Pima lateral is completed as far as the Sacaton Dam.

The remaining work covering construction for the next three years contemplates the completion of the Florence Casa Grande Canal; the repair of the Little Gila (an old canal) and the Casa Blanca Canal for the south side lands below the present completed section of the Pimal lateral; the repair and extension of the Santan Canal; the building of a connection from the Sacaton Dam to supplement the water of the Little Gila; construction of the system to supply the lands on the north side of the river, north and west of Florence; and in addition thereto the completion of the sublateral system to serve such lands as may then be ready to start farm operations.

It is anticipated that it will be necessary to supplement the water supply by pumping from wells as the full acreage is brought under cultivation. A dozen wells were put down on the reservation on the north side of the river 20 years ago that have been used for supplementing the flood water flow of the river. These wells were at the time put in as a temporary arrangement. As irrigation increases drainage will become a more pressing problem.

Allotments.—Allotments of 10 acres of agricultural and 10 acres of grazing land were made to each Indian, amounting in all to 48,940 acres. These allotments were made in 1914. The allotments—from the very nature of the practice of allotting to every Indian man, woman, and child—have led to a very patchy system of irrigation. This makes the cost of operation and maintenance costly and unsatisfactory. The Board of Army Engineers in a report transmitted to Congress on February 24, 1914, pointed out the inadvisability of making permanent allotments in the following language:

"In the beginning the Indians can not be expected to efficiently cultivate the entire 40,000 acres proposed to be included in the project, nor in fact to cultivate any considerable greater acreage than that which will afford them a bare subsistence, and yet the failure to efficiently cultivate the entire acreage for which stored water is provided means that the land will not be earning an income on

the investment and that some of the stored water is not being put to beneficial use. * * * It might even be found to be advisable for the Indian Bureau to undertake the cultivation of a certain area, employing the Indians as farm laborers until they have acquired the ability and the means for cultivating temporary allotments afterwards to be assigned to them. Finally, after a number of years of fostering care, permanent allotments may be made. At the present time to make permanent allotments of 10 acres of irrigated land to each man, woman, and child would result in a large part of the land lying idle and in another part being poorly farmed."

The conditions not only upon this project but every other large Indian project have shown the wisdom of the advice made by the above board, yet it does not seem to have moved the Government to effect a much needed reform in the allotting system.

Repayment of the cost of the Sacaton Dam and Bridge.—The act of May 18, 1916 (39 Stat. 129), provided "for beginning the construction by the Indian Service of a dam with a bridge superstructure and the necessary controlling works for diverting water from the Gila River for the irrigation of Indian land and Indian allotments on the Gila River Indian Reservation, Arizona, as recommended by the board of Engineers of the United States Army in paragraph 217 of its report to the Secretary of War of February 14, 1914 (H. Doc. 791), $75,000 to be immediately available and to remain available until expended, reimbursable as provided in section 2 of the act of August 24, 1912 (37 Stat. 522), the total cost not to exceed $200,000. The act of March 3, 1917 (39 Stat. 974), appropriated an additional $125,000 to be available under the same conditions as above.

The act of May 25, 1918 (40 Stat. 568), appropriated an additional $50,000 to be available under the same conditions as above, except the total cost was changed from $200,000 to $250,000.

The act of March 3, 1921 (42 Stat. 773), made an additional $160,000 immediately available, reimbursable under the same conditions as above. The total cost was changed from $250,000 to $400,000.

The act of April 3, 1924 (43 Stat. 42), appropriated $300,000 to be available to June 30, 1925, reimbursable as provided above.

The act of December 13, 1924 (43 Stat. 707), appropriated $6,070, reimbursable. The balance of funds were from appropriations for increased compensation and funds for general administration.

The total cost of the structure to June 30, 1927, was $719,793.21, which under the act of August 24, 1914, makes the total amount reimbursable and provides for the patent to any allotment to contain a clause making the unpaid amount of said reimbursable amounts a first lien on such allotment. The bridge and dam were built as one structure and no separate costs were kept as to the relative cost of either. The bridge, however, is estimated to have cost $346,200.70. As constructed the bridge is a convenience in the operation of the dam and headworks, but not a necessity. The bridge is used as a highway crossing for the use of the public passing back and forth over the Gila River. The appropriation bills provided for it to be built as a combination structure to be used as it would seem it is being used—the bridge for public purposes in which all the people of the State are interested, and the dam for the benefit of specific lands. It is not equitable that the lands should be made to pay for the cost of the bridge used for public purposes. It may be true that the Indians will use the bridge and should in equity help to pay for such public improvements. However, if such is the case, it should be done as a tribal matter out of tribal funds and not be collected as part of an irrigation charge on the lands of individual Indians.

The Federal Government is spending large amounts of money in the State of Arizona on public highways, and it would not seem to be unjust if in the future this bridge should become a part of a Federal-aided highway of the State that the cost of the bridge should be considered as a part of the Government's contribution in highway building and the cost recovered in this way. Your advisers however, believe that $346,200.72, the cost of the bridge, should not be made a reimbursable charge against the Indian land.

The project has been constructed piecemeal and, as pointed out, a considerable portion of the early canal construction was accomplished before a general and comprehensive plan for development was conceived and executed. Some of the early canals were taken out of the river without means of diverting water to them. Some of these works have been destroyed by floods and other parts will be made useless in the general plans now being carried out. The 12 wells and pumping stations put in on the reservation were a substitute to supply water from underground sources and had the water rights been properly protected

would have been unnecessary and especially so with the construction of the San Carlos Reservoir. The works that have been constructed that will not contribute to and become a part of the final finished system should not become a part of the final construction costs.

A number of experimental structures to which reference is made in the general discussion are found upon this project that have cost more than structures of standard design. This cost should not be charged to the reclaimed lands. The three outstanding examples are the bridge constructed as a part of the Bacaton Dam authorized by Congress, but undoubtedly from the first amount authorized it was not anticipated that so costly a structure would be designed and constructed, the open conduit built as a part of the same dam that is useless in its present form and the China Wash or Olberg flume.

As costs on the the works that will be useless are difficult to obtain, it is the opinion of your advisers that upon completion of the projects a board should be convened to appraise the cost of the works that will then constitute the project works and that amount taken as the entire cost of the project. Due to the conditions that have heretofore been stated, the operation and maintenance costs to date can hardly be considered a just charge against the lands.

Irrigation on Fort Hall Reservation, Idaho

1. RECOMMENDATIONS

It is recommended:

1. That the general recommendations relating to determination of irrigable productive area and to future extensions be applied to this project.

2. That the suit now pending for the adjudication of the Blackfoot River waters be brought to a conclusion as soon as possible, and by agreement or stipulation of the interested parties, if that be feasible.

3. That, as the Government in the conveyance of stored water through the channel of the Blackfoot River, apparently has disregarded private property rights and has thus possibly caused damage to both lands and crops, immediate steps be taken toward the equitable adjustment of these difficulties.

4. That steps be taken to secure an appropriation, chargeable to the land benefited, to construct diversion works and improve the canal system of the Little Indian unit of this reservation, and that it thereafter be treated as a part of the Fort Hall project.

5. That, as the Government has been dilatory in the development of the Grays Lake auxiliary storage, and has thus apparently caused damage to crops and lands belonging to people of that vicinity, a thorough investigation of all damage claims arising out of this development be made by an engineer in no way connected with the project.

6. That the Grays Lake development be completed at the earliest date possible, and that it include the enlargement or improvement of Meadow Creek channel, or the construction of a channel for conveyance of water from Grays Lake to Blackfoot Reservoir, and that with this end in view a congressional appropriation of $30,000 be requested.

7. That the various questions relative to the sale of water rights for lands in private ownership under the irrigation system, which involves the determination of cost and form of contract for sale of water to new lands; the reinstatement, execution of contracts, and determination of cost of water rights for lands upon which water-right agreements under the provisions of the act of March 1, 1907, were canceled by default in repayment; and the sale of water rights for irrigable Indian tribal and grazing lands under the irrigation system, which are questions that have been before the Indian Bureau for some years, should be definitely settled at an early date by departmental order.

8. That the control and jurisdiction of public lands withdrawn for the Blackfoot and Grays Lake Reservoirs, should be placed in the irrigation department, Fort Hall project, and the revenues from leases should be made by the project and appear as credits to irrigation collections.

9. That the conditions and status of contracts for homestead lands in the ceded tract—known as the Dunn-Martin high area—being similar to those of the Williamson Hill tract, which has been provided with irrigation facilities, the Dunn-Martin area should receive the same benefits, and that the construction accounts for these lands be credited pro rata to the extent of $745.58, the amount jointly expended by these landowners for electric pumping equipment; and that water service be provided for this area in the future by the Government, at the

same operation and maintenance charge as applies to the remainder of the project.

10. That legislation be effected that will provide for the collection of the total pro rata per acre cost of irrigation construction in 30 annual installments, from irrigable tribal and grazing lands under the irrigation system when leased, and that provision be made for leasing lands in this class for long periods under favorable terms.

2. SYNOPSIS

The Fort Hall Indian Reservation, in the Snake River Valley of southeastern Idaho, was established by Executive order of June 14, 1867, in pursuance of treaties of July 2 (Fort Bridge treaty) and July 30, 1863, between the United States and the Northwestern Band-Shoshone Indians. Originally the reservation embraced an area of about 1,800,000 acres. The present area is 471,466 acres.

The Fort Hall project embraces an area of approximately 62,000 acres lying between the Blackfoot River on the north, and the Portneuf River on the south.

Transportation and markets.—Pocatello (population 20,000) in the southern part of the project is a railroad division point on the Oregon Short Line Railroad of the Union Pacific system, being on the east-west transcontinental line, and also on the north-south Salt Lake to Butte line. The latter line passes through the center of the project and affords convenient shipping points. Blackfoot (population 4,500), near the northern boundary of the reservation, is 26 miles north of Pocatello. Fort Hall (population 150), midway between Pocatello and Blackfoot, is the location of the Indian agency and irrigation project headquarters. The Yellowstone Highway, paralleling the railroad, passes through the center of the project. Most of the products are marketed locally at Blackfoot and Pocatello. There is a beet-sugar factory at Blackfoot and cheese factories at both Blackfoot and Pocatello.

Allotments.—All irrigable and grazing land was allotted in 1912. Each Indian then living received an irrigable and a grazing allotment. Nineteen hundred and forty-six irrigable allotments of 20 to 40 acres each, aggregating 36,930 acres and 1,946 grazing allotments of 160 to 320 acres each, aggregating 332,770 acres were made and approved. Fee patents hav been issued to approximately 130 Indians, who have sold 114 irrigable allotments aggregating 4,810 acres and 32 grazing allotments aggregating 5,000 acres; 74 irrigable allotments aggregating 1,708 acres, and 19 grazing allotments aggregating 3,040 acres, have been sold by the heirs of deceased Indians.

Population and Indian health.—The Indians are of three tribes: the Bannocks, Lomhi, and Western Shoshones, with a total population of 1,765, of whom 1,573 are fullblood. There are 383 families; 220 of these live in permanent homes. It is reported there are 30 cases of tuberculosis, and 40 cases of trachoma. About 29 Indians, aged and indigent, receive rations.

Climate.—Range in altitude of project 4,300 to 4,500. Range in temperature 106° to 32° below zero. Average length of the growing season is 150 days.

Soil and drainage.—There has been no detailed soil survey. About 75 per cent of the irrigable areas consist of sandy loams and are quite suitable for irrigation, farming, and cultivation. The native vegetation of the bottom lands is meadow grass, and of the uplands, grass and sagebrush. Drainage conditions for most lands are excellent and it is improbable that any deep drainage will ever be necessary except for a limited area in the southern part of the project. Some surface drains and wasteways have been constructed.

Water supply and water rights.—The water supply is from the Blackfoot River, with the Blackfoot Reservoir (capacity 410,000 acre-feet) and Grays Lake, auxiliary reservoir (capacity 40,000 acre-feet) which, however, is not yet completed; and a decreed water right with a priority of December 14, 1891, to 600 second-feet in the Snake River. The safe annual water supply as estimated from data now available is 300,000 acre-feet—sufficient for the irrigation of approximately 60,000 acres. Action on a proposed suit to adjudicate, or to quiet title in and to the waters of the Blackfoot River, is now pending with the Department of Justice.

General plan of irrigation development.—The Fort Hall project area of 62,000 acres is supplied principally by flood water stored in the Blackfoot and Gray's Lake Reservoirs, which is conveyed down the river channel for 58 miles to two project diversion dams located about 2 miles southeast of Blackfoot. Blackfoot River water is also supplemented by Snake River water supplied through the

Idaho Canal, with a capacity of 850 to 1,100 second-feet, which diverts near Shelley, Idaho, and discharges into the Blackfoot River about 7 miles above the project diversions. Water is diverted from these two diversion dams on the south side of the Blackfoot River for the Fort Hall main canal and the north canal, the principal canal systems of the project. The main canal is 25.3 miles in length with a capacity of 580 to 1,400 second-feet, and now serves about 26,000 acres of Indian lands in the reservation, 13,500 acres of white-owned homestead lands of the ceded tract outside of the reservation, terminating at the city limits of Pocatello. Capacity was also provided in this canal, under the enlargement and reconstruction work authorized by the act of Congress of May 24, 1922, for the irrigation of about 26,000 acres of Indian reservation lands—some of it now in white ownership—in the proposed Michaud Unit or extension of the present project, lying between Pocatello and American Falls. The present (Seventieth) Congress has authorized an appropriation of $145,000 for the completion of the lateral system for the remaining 10,000 acres included in this project area, which is under the main canal system, but which was not included in the plans and estimates of construction, as provided by the act of May 24, 1922 (providing supplemental construction work for 52,000 acres). This area will be served by both the main and north canals.

Summary of project works.—There are 237 miles of canals and laterals and 16 miles of drains and wasteways; 18 miles of canals have a capacity of 1,000 second-feet or more; 22 miles, capacity 500 to 1,000 second-feet; 10 miles, capacity 250 to 500 second-feet; 13 miles, capacity 100 to 250 second-feet; 50 miles, capacity 50 to 100 second-feet; and 142 miles with capacity of less than 50 second-feet. Included in the lateral system are 13,900 feet of pipe line or conduits from 18 to 78 inches in diameter; three of these are reinforced concrete, one of steel and one of wood. There are a total of about 2,000 canal and lateral structures costing from $25, for the average farm headgage, to $9,000 for a large canal structure, representing a total cost of about $250,000. There are also two reservoirs—the Blackfoot, area 18,000 acres, storage capacity 410,000 acre-feet; and Gray's Lake, area 20,000 acres, storage 40,000 acre-feet. The system also includes two small concrete diversion dams and three large canal headgate structures.

Utilization of Land.—During the season 1926, out of 50,000 acres in the Fort Hall project system provided with irrigation facilities, 29,058 acres were irrigated, and 28,362 acres, or 57 per cent were cultivated. In addition to this, there were about 5,330 acres included in four minor irrigation units of the reservation, partially provided with irrigation facilities, out of which 4,324 acres were irrigated and 4,193 acres, or 79 per cent, were cultivated.

Two hundred thirty-six Indian farmers irrigated 9,359 acres of project Indian land, of which 7,359 or 79 per cent were in cultivated crops and 2,000 acres in irrigated pasture. Indian farmers cultivated an average of 33 acres per family.

Eighty lessees irrigated 5,768 acres, all of which was in cultivated crops. Lessees cultivated an average of 72 acres each.

Two hundred fifty-six white landowners irrigated 13,931 acres, of which 13,243 acres, or 95 per cent was in cultivated crops. Owners cultivated an average of 52 acres each.

Principal crops, yields and returns.—The principal crops grown by the Indians (1927) were: 5,020 acres alfalfa, average yield 1.7 tons, average returns $13.58 per acre; 1,447 acres wheat, average yield 15.7 bushels, average acre return $15.69; 389 acres oats and barley, average 22 bushels, average acre return $12; 209 acres potatoes, 199 bushels, average acre return $67.34. The total value of Indian crops was $114,841.30 or an average acre return of $15.65. The average farm income per family was $462.

The principal crops grown by lessees and non-Indian owners on the reservation were: 3,066 acres alfalfa, average yield, 2.14 tons, average acre return $19.30; 2,040 acres wheat, 22.3 bushels, average return $22.32; 1,273 acres potatoes, 239 bushels, average return $80.21; 125 acres alfalfa and cloverseed, 17.9 bushels, average return $110.98. The total value of the crops was $235,532, or $30.33 per acre.

The principal crops grown by white landowners (homestead lands) of the ceded tract were: 3,712 acres alfalfa, average yield 2.8 tons, average acre return $25.89; 2,457 acres of potatoes, 257 bushels, average acre return $87.44; 2,325 acres wheat, 31.2 bushels, average acre return $31.18; 159 acres green peas, 87.4 bushels, average acre return $174.70; 179 acres garden vegetables, average acre return $116.51. Total value of all crops in this class was $495,752.89, or $45.63 per acre.

Construction cost.—To June 30, 1927, the total expenditure for irrigation construction was $1,752,302.67, of which $1,653,549.56 was for the authorized Fort Hall project, or an acre cost of $32.85 for the acreage provided with irrigation facilities; $97,950.54 has been expended in providing main canal capacity for the proposed Michaud unit; and $1,002.57 construction expenditures for other minor reservation units.

When additional construction work, provided by funds authorized by the Seventieth Congress, first session, is completed, the total estimated construction cost will be approximately $1,817,000 for 60,000 acres, or $30.30 per acre.

Probable future development may include the construction of irrigation facilities by the extension of the present main canal for the irrigation of the Michaud unit of 26,600 acres, lying on the south side of the Portneuf River and the American Falls Reservoir, for which $97,950.54 has already been expended. The irrigation of an additional 16,000 acres of arable reservation lands and 8,000 acres of homestead lands are also possible by the development proposed for the Buckskin Basin, Lincoln Creek, and Pocatello Bench units or extensions.

The present Congress (Seventieth) has authorized an appropriation of $25,000 (Michaud surveys and investigations) for the purpose of making detailed surveys and estimates to determine the costs and feasibility of construction for that above proposed unit.

Collection of construction cost.—Of the money expended (total, $1,752,302.67) for construction to June 30, 1927, $219,070.99 is Indian tribal money, $10,655.80 is nonreimbursable expenditure, $1,519,559.34 are reimbursable appropriations from the United States Treasury and $3,016.54 are construction improvements cost under nonreimbursable annual appropriations for operation and maintenance.

The acts of March 1, 1907 (34 Stat. 1024) and April 4, 1910 (36 Stat. 274) provide that "lands in private ownership shall pay only $6 per acre for water rights, including construction charges." (Practically all the lands affected by this provision—about 12,500 acres of homestead land in the ceded tract—have completed repayments, making the total collection to December 1, 1927, approximately $73,620.90.)

The act of March 1, 1907, provides that lands "owned by Indians in severalty or in common shall be deemed to have a water right without cost to the Indians so long as the title remains in said Indians or tribe." According to this provision, construction costs for Indian lands under the act of March 1, 1907, are uncollectible. The total cost of project construction to June 30, 1915, as set up by the field cost accountant under the provisions of the act of August 1, 1914 (38 Stat. 582), was $821,681.44. (Pub. Doc. No. 1268.) Repayment collections from private landowners under the provisions of the act of March 1, 1907 ($6 per acre), have been paid in full (except for adjustments due to discrepancies in area), and total $73,620. Deducting this amount, plus $19,453.24 of general Indian Office irrigation expenditures made reimbursable under the act of August 1, 1914, and $121,120.45 expended in construction from tribal funds, from the above total cost of $821,681.44, leaves $607,486.85 as uncollectible, or a gratuity to the Indians under the provisions of the act of March 1, 1907, and not reimbursable as the records indicate.

The act of May 24, 1922 (42 Stat. 568), provides that private landowners shall pay "not to exceed $15.10 per irrigable acre" as their prorata share of the project enlargement and supplemental construction cost; and also "that there is created a lien against lands in Indian ownership for the proportionate share of money expended under the provisions of the act of May 24, 1922, which shall be enforced against such lands by the Secretary of the Interior under such rules and regulations, and conditions as he may prescribe."

In view of the provision in the act of March 1, 1907, that water is to be furnished to the Indians without cost so long as the title remains in them or the tribe, there may be some doubt as to whether the provision of the act of May 24, 1922, creating a lien against the lands in Indian ownership, can be enforced and construction costs collected without legislation by Congress modifying or repealing the provisions in the act of March 1, 1907.

The total area signed up under the reimbursable agreements, in accordance with the provisions of the act of May 24, 1922, is approximately 15,171.83 acres, which may be increased to approximately 15,794 acres as soon as the status of contract matters, awaiting Indian Bureau approval for the past two years, is definitely settled. The probable repayment for construction under the act of May 24, 1922, will be approximately $238,489.40, out of an expenditure of $746,881.45 (to June 30, 1927), under the act of May 24, 1922, leaving the

balance, $508,392.05, as a lien against about 35,158.17 acres of Indian-owned land, if present legislation provides for this.

Operation and maintenance cost.—To June 30, 1927, the operation and maintenance cost was $859,326.59, or about $17 per acre for the area under constructed works; $263,063.88 of this amount is expenditures of collections from lessees, non-Indian, and homestead landowners; $2,910.34 from Indian tribal funds; $31,421.84 from general Indian Office appropriations (reimbursable by the act of August 1, 1914, 38 Stat. 582); and $310,485.23 expenditures from non-reimbursable appropriations; and $251,445.28 from Congressional reimbursable appropriations.

The total cost of operation and maintenance for 1926 was $62,645.07, of which approximately $27,000 was paid by landowners and lessees.

Collection of operation and maintenance cost.—The act of March 1, 1907 (34 Stat. 1024), provided that water shall be furnished for the irrigation of lands owned by the Indians "without cost to the Indians so long as the title remains in said Indians or tribe, but any lands leased for a longer term than three years shall bear their prorata part of the cost of the maintenance of the system. * * *." According to the foregoing, no operation and maintenance costs can be collected from the Indian lands not leased, and the operation and maintenance expenditure, on account of Indian lands not leased, which are on record as reimbursable, can not be collected under the present laws.

Collections are made from all lessees who lease Indian lands for a period of three years or more, and from the non-Indian landowners. Annual collections from this source amount to approximately $25,000 to $27,000, and are immediately expendable for operation and maintenance under the act of August 1, 1914. For 1926 the per acre assessment was $62,645.07 for 50,000 acres, or $1.253 per acre.

The total assessments to June 30, 1927, on homestead, non-Indian owned land, and leased lands, was $288,485.12, of which $227,947.51 was collected from the landowners, $56,014.94 from lessees, and $4,522.67 unpaid on that date. A penalty of 6 per cent per annum is charged on delinquent accounts.

Government investment.—The total investment in irrigation construction, operation, and maintenance, to June 30, 1927, less collections, was $2,148,306.48, of which $2,042,738.09 is for the authorized Fort Hall project; $97,950.54 is advance construction expenditure for the proposed Michaud unit, and $7,617.85 has been expended on other minor irrigation units of the reservation.

Probable returns on investment.—According to the act of March 1, 1907 (34 Stat. 1024), which provides that "water is to be furnished for irrigation of lands owned by the Indian in severalty or in common without cost, so long as title remains in the Indian or tribe," it would appear from the foregoing that construction costs, under the act of March 1, 1907, amounting to $607,486.85, and operation and maintenance costs amounting to $251,445.28 (congressional operation and maintenance appropriations designated as reimbursable), are not collectible by law. Also there may be some question as to whether supplemental construction costs under the act of May 24, 1922 (42 Stat. 568), amounting to $508,392.05, which are made a lien against lands in Indian ownership, can be lawfully collected.

Project problems, defects, and complaints.—The more important problems which may involve additional appropriations and further construction are being investigated at the present time, and will be the subject of later reports to be submitted as justification for the appropriations required. The principal matters in this category are the completion of Grays Lake Reservoir and outlet channel, so that storage operations and release of stored waters may be effected without complaint, and the possible injury to landowners of marginal lake lands and of the lands adjacent to the outlet channels. The Blackfoot River Channel, carrying stored water from the reservoirs, and also Snake River water conveyed in this channel to the project canal diversion works, must be enlarged or improved before the ultimate water supply required for the irrigation of the Fort Hall project lands can be safely carried in this channel. Some flood damage has already resulted to adjacent privately owned lands from Government operations in the river, and some landowners also contend that their farms are being permanently damaged from these operations. It is now estimated that an expenditure of approximately $100,000 to $125,000 will be required in further construction for the above features, to protect the landowners and provide adequate conveyance capacity for the ultimate supply required for the future increased irrigated area.

The act of March 1, 1907, provides that failure to make any two payments the landowner will forfeit all previous payments and suffer the cancellation of the

water-right contract. Between 1920 and 1925 water rights on approximately 303 acres of land have been canceled by this provision, and the landowners have persistently endeavored to secure the reinstatement of water rights at such terms as may be prescribed. Local officials were informed that the landowners would be required to pay the actual per acre cost of construction for a reinstatement of water rights. This matter has involved considerable correspondence between the Indian Office, local officials, and the landowners, who are anxious to definitely establish the status of water rights and willing to pay the actual per acre cost of construction. A definite decision and departmental action relative to this matter has been urged by local officials for the past two years, but to date no definite instructions have been received.

Additional areas of private lands were also made susceptible of irrigation of project reconstruction under the act of May 24, 1922, for which water rights are desired by landowners. Action on this, as well as other water-right contract matters involving conflicting land descriptions and areas—signed up under agreements under the provisions of the act of May 24, 1922, and not included in water-right contracts under the act of March 1, 1907—has also been delayed awaiting departmental decision and approval.

Certain owners of homestead lands in the ceded tract whose lands were above the gravity flow laterals of the original irrigation system secured water rights under the act of March 1, 1907 (paying $6 per acre), and irrigated these areas by pumping. After enlargement and rehabilitation work was started under the act of May 24, 1922, these landowners contended that they signed the reimbursable agreements under the provision of the latter act, because they were promised by Government officials that the supplemental construction work would provide their lands with irrigation facilities. Former officials denied that any such definite promises were made. Officials later in charge of construction also contended that this program did not include the construction of pipe lines or provision of pumping equipment by the Government for these areas. Voluminous correspondence resulted, and numerous reports to the Indian Office on these matters were made. A total area of approximately 633 acres, included in three principal tracts of 410 acres, 96 acres, and 127 acres each were involved. Landowners of the largest tract of 410 acres, after sending representatives to Washington, were successful in securing authorization from the Indian Bureau for the construction of a siphon or pipe line, costing approximately $22,000, for that area. The landowners of the two remaining tracts contended that there was discrimination, and that they are entitled to similar benefits from the Government, because water-right contracts and conditions are similar. The latest decision of the Indian Office respecting the two remaining tracts does not favor further provision by the Government of irrigation facilities for these tracts, and suggests to the supervising engineer that these areas be eliminated from the project with the cancellation of water rights, which the landowners refuse to consent to.

It is apparent that the Indians are not making full utilization of all of their irrigable lands, and under present conditions—lack of homes, domestic water supply, financial assistance for seed and implement, and lack of agricultural knowledge and experience, and inadequate technical advice and assistance, probably will not be able to do so. There is a decided demand on the part of local residents of this locality for leasing these uncultivated lands, but many prospective lessees and the civic organizations of neighboring towns complain that they can not secure from the reservation superintendent definite information as to availability of lands for leasing, and also that in many cases, when definite propositions are made, that the terms offered are unfavorable—period of lease is too short to justify any improvement and returns to lessee. In view of the extensive irrigation system that has been constructed, with its many water supply features and extensive canals, operation and maintenance can not be reduced; and under the present law there is no possibility of collecting costs from the Indians. It is necessary, therefore, for Congress to annually appropriate funds, which are not reimbursable by law, to maintain the system for Indian lands. The average lessee adds from $25 to $50 per acre to the value of the lands by leveling, fencing, and ditching, besides paying his pro rata share of the cost of operation and maintenance, thus reducing the cost to the United States. While agricultural economic conditions on the improved lands appear quite favorable, they are attained with extreme effort and hardship on the part of the farmer, and the returns for the first few years while lands are being put in shape—leveled, ditched, and the attainment of soil humus—are very meager. Production is limited by the altitude and length of growing season to staple crops on which returns are limited because of transportation costs to distant markets.

For this reason, and the desirability of the Government to economize operation expense and reduce congressional appropriations, it is advisable to make exceptionally favorable terms to lessees, who should be encouraged to do more extensive land improvement work, for which some credit should be given him on lease payments asked by the Indian owners.

3. DIGEST OF LEGISLATION, TREATIES, AND EXECUTIVE ORDERS

The Fort Hall Indian Reservation was established by Executive order of July 14, 1867, issued in pursuance of the treaties of July 2, 1863 (the Fort Bridger treaty), and July 30, 1863.

Act of Congress of September 1, 1888 (25 Stat. 452), accepted and ratified an agreement with the Shoshone and Bannock Indians for the surrender and relinquishment to the United States of a portion of the Fort Hall Reservation, to be set aside for the town site of Pocatello and provision for railroad right of way and railroad yards near this town site. This act provided for the cession of approximately 1,840 acres which were to be surveyed and laid off into blocks and lots as a town site, and, after due appraisement, to be sold at public auction to the highest bidder, for the benefit of the Indians. The act also provided for the cession of approximately 150 acres of land, to be used for a railroad station, shops, and railroad yards to the Utah and Northern Railroad Co., for which the Indians were to receive $8 per acre.

Act of March 3, 1891 (26 Stat. 989), authorized the Secretary of the Interior to grant rights of way into and across the Fort Hall Reservation to ditch, canal, or reservoir companies for the purpose of enabling the citizens of Pocatello to receive a water supply and carrying out the other provisions of section 10 of the act of September 1, 1888 (25 Stat. 453).

Act of August 15, 1894 (28 Stat. 305), directed the Secretary of the Interior to contract with responsible parties for the construction of irrigating canals and the purchase, or securing of a water supply for irrigating lands on the Fort Hall Indian Reservation, "that the expense of constructing the said canals or securing of water supply, shall be paid out of moneys belonging to the said Fort Hall Indians, now in the Treasury of the United States, and subject to the disposal of the Secretary of the Interior for the benefit of said Indians."

Act of October 2, 1896, provided for the approval of the contract made with the Idaho Canal Co., under the provisions of the act of August 15, 1894, and also provided for certain modification and revision of the terms of the original contract as to the location of the canal under construction.

Act of June 6, 1900 (31 Stat. 672), provided for the ratification of an agreement with the Indians of the Fort Hall Reservation to grant and code to the United States all that portion of the reservation lying east and south of the following described lines:

"Commencing at a point in the south boundary of the Fort Hall Indian Reservation, being the southwest corner of township 9 south, range 34 east of the Boise meridian, thence running due north on the range line between townships 33 and 34 east to a point 2 miles north of the township line between townships 5 and 6 south, thence due east to the range line between ranges 35 and 36 east, thence south on said range line 4 miles, thence due east to the east boundary line of the reservation; from this point the east and south boundaries of the said reservation as it now exists to the point of beginning, namely, the southwest corner of township 9 south, range 34 east, being the remainder of the description and metes and bounds of the said tract of land herein proposed to be ceded."

In consideration of the lands ceded, the United States agreed to pay to and expend for the benefit of the Indians $600,000, divided into nine annual payments, the deferred payments to bear interest at the rate of 4 per cent per annum, which was to be placed to the credit of the Indians or expended for their benefit by the Secretary of the Interior. It was further provided that none of the money due the Indians under this agreement should be subject to the payment of any claims, judgments, or demands against said Indians for damages or depredations claimed to have been committed prior to the signing of the agreement. Provision was also made for allotting to the Indians the lands occupied and cultivated under the sixth section of the Fort Bridger treaty, and for holding their allotments of lands included within the boundary of this cession. Provision was also made for a highway from McCammon to Blackfoot, and also from McCammon to American Falls through the lands ceded and the remaining portion of the reservation. The act also provided for the survey of this cession, which was to be opened to entry under the terms of the homestead law, except as to price. For the lands opened to entry, homesteaders were required to pay $10

per acre for agricultural land susceptible of irrigation from the Idaho Canal, $2.50 per acre for agricultural land not under the canal, and $1.25 per acre for grazing land. The lands ceded by this act were ordered open to entry by the public under the proclamation of President Roosevelt of May 7, 1902.

Act of June 21, 1906 (34 Stat. 334), provided for an appropriation of $25,000 for making surveys and the preparation of plans for an irrigation and storage system for the Indian lands and lands ceded by the act of June 6, 1900, on the Fort Hall Reservation, Idaho.

Act March 1, 1907 (34 Stat. 1024): "That the Secretary of the Interior be, and he is hereby, authorized to acquire by purchase or condemnation on behalf of the United States all land in townships 4, 5, 6, and 7 south, ranges 40, 41, and 42 east, Boise meridian in Idaho, that he shall deem necessary in constructing a reservoir for storing water for the purpose of irrigating lands on the Fort Hall Indian Reservation and those ceded by the Indians of the said reservation, and also the lands, rights, and property which he may determine to be necessary to the success of any enlargement to be made of any irrigating system in accordance with the laws of Idaho that circumstances may require."

Upon acquiring the site, as herein provided, the Secretary may cause the system determined on to be constructed by contract or otherwise, in sections or as a whole, as he may determine, and may sell the water right for lands in private ownership at $6 an acre, but no such right shall permanently attach until all payments therefor are made. The amount at which such water rights shall be sold shall be payable in five equal annual installments, to be paid to the receiver of the local land office, and the failure to make any two payments shall work a forfeiture of the rights acquired by the purchaser, and he shall lose the money previously paid and the water right for the land, but it may be purchased by another person who shall thereafter acquire the land in question at such price and upon such conditions as the Secretary of the Interior may determine, but not less than the cost originally determined. In addition, the same fee shall be paid to the register and receiver as though the land was entered as a part of the public domain at $1.25 an acre; the money so paid, less the fee, shall reimburse the United States for the expenditures made thereunder.

The land susceptible of irrigation under the system herein provided and owned by Indians in severalty or in common shall be deemed to have a right to so much water as may be required to irrigate said lands, without cost to the Indians so long as the title remains in said Indians or tribe, but any such lands leased for a longer term than three years shall bear their pro rata part of the cost of the maintenance of the system that may be constructed, and when the Indian title is extinguished these lands shall also bear their pro rata cost of maintenance. When the payments required by this act are made for the major part of the lands that can be irrigated from the system, the management and operation of such irrigation work shall pass to the owners of the lands irrigated thereby, to be maintained at their expense under such form of organization and under such rules and regulations as may be acceptable to the Secretary of the Interior, in accordance with the statute of the State of Idaho. The title to and management and operation of the reservoir and the works necessary to its protection and operation shall remain in the Government until otherwise provided by Congress. The Government institutions established for the administration of the affairs of the Fort Hall Reservation, including the school plant and farm, shall have sufficient water for their needs without cost, and any town or city embraced within the project may acquire water rights sufficient for its needs on such terms and conditions as the Secretary of the Interior may impose.

The water rights acquired or provided for in this measure shall be appurtenant to the lands irrigated, and there is hereby appropriated for the purpose of carrying out the provisions of this act, $350.000, which shall be reimbursed the United States from the moneys obtained from the sale of water rights, and the Secretary of the Interior shall have full power to do all acts or make all rules and regulations necessary to carry out the provisions of this act relating to the foregoing irrigation system.

Amendatory and supplementary to the foregoing, the act of Congress of April 30, 1908 (35 Stat. 78), appropriated $100,000, and the act of March 3, 1909 (35 Stat. 790), $100,000 for continuing construction of the project. The latter act also provided $25,000 additional for payment of damage claims in connection with construction of the Blackfoot Reservoir.

Act of April 4, 1910 (36 Stat. 274), appropriated $100,000 for continuing the work of construction on the irrigation system for the irrigation of lands on the Fort Hall Reservation and lands ceded by the Indians, and provided "that

the amount hereby appropriated, and all moneys heretofore or hereafter to be appropriated for this project, shall be repaid into the Treasury of the United States in accordance with the provisions of the act of March 1, 1911: *Provided further*, That lands in private ownership shall pay only $6 per acre for water rights, including construction charges, in accordance with the act of March 1, 1907: *Provided however*, That in case of any forfeiture of the rights acquired by the purchaser he shall lose the money previously paid and the water right for the land, but it may be purchased by another person who shall thereafter acquire the land in question at such price and on such conditions as the Secretary of the Interior may determine, but not less than the cost originally determined * * *."

Act of June 25, 1910 (36 Stat. 744), provided $25,000 for continuing construction as provided by the acts of March 1, 1907, and April 4, 1910.

Act of March 3, 1911 (36 Stat. 1063), provided $75,000 for the completion of construction of the irrigation system, and $10,000 for maintenance. This act also provided for allotments to be made of the lands on the Fort Hall Reservation "to each head of a family whose consort is dead, 40 acres of irrigable land and 320 acres of grazing land, and to each other Indian belonging on the reservation or having rights thereon, 20 acres of irrigable land and 160 acres of grazing land."

Act of August 24, 1912 (37 Stat. 524), appropriated $20,000 and the act of June 30, 1913 (38 Stat. 87), $20,000 for the operation and maintenance of the Fort Hall irrigation system.

Act of August 1, 1914 (38 Stat. 582), appropriated $25,000 for the maintenance and operation of the Fort Hall irrigation system, reimbursable to the United States out of any fund of the Indians of this reservation, now or hereafter available.

Act of March 4, 1914 (38 Stat. 1228), provided $25,000 for operation and maintenance for the fiscal year 1916.

Act of May 18, 1916 (39 Stat. 132), provided $25,000 for "improvement, operation, and maintenance, reimbursable from any funds of Indians now or hereafter available."

Act of March 2, 1917 (39 Stat. 976), provided $25,000 for improvements, operation, and maintenance, expenditures for improvements to be reimbursable in accordance with the provisions of the act of March 1, 1907.

Acts of May 25, 1918 (40 Stat. 571), June 30, 1919 (41 Stat. 13), February 14, 1920 (Public 141, 66th Cong.), and March 3, 1921 (Public 359, 66th Cong.), provided $50,000 each, respectively, for improvement, maintenance, and operation, reimbursable in accordance with the provisions of the act of March 1, 1907.

Act of May 24, 1922 (42 Stat. 568), provided $50,000 for improvement, maintenance, and operation of the Fort Hall irrigation system.

For enlarging and repairing canals, repairing structures and dam, and replacement of structures of the irrigation system for the irrigation of lands on the Fort Hall Reservation, Idaho, and lands ceded by the Indians of said reservation, $300,000, to be immediately available, the total cost of the work to be done on this project not to exceed $760,000: *Provided*, That the amount herein appropriated and the amount to be appropriated in the future for the completion of the work shall be divided equitably by the Secretary of the Interior between the Indian lands and the lands in private ownership: *Provided further*, That no additional work toward the enlargement of this project, but only the necessary repairs to the present project, shall be made unless and until the Secretary of the Interior shall be able to make or provide for what he shall deem to be satisfactory agreements with such private landowners to repay their proper proportionate part of the cost of the entire work to be done: *And provided further*, That in case of lands still held in Indian ownership benefited hereby there is created a lien against such lands for the proportionate share of the money expended hereunder, which shall be enforced against such lands by the Secretary of the Interior under such rules, regulations, and conditions as he may prescribe.

Act of January 24, 1923 (42 Stat. 1192), provided $50,000 for improvement, maintenance, and operation, and $230,000 for continuing enlargement and repair supplemental construction under the provisions of the act of May 24, 1922.

Act of May 9, 1924 (43 Stat. 118), authorized the Secretary of the Interior to expend $100,000 from funds now on deposit to the credit of the Indians of the Fort Hall Reservation, for providing sufficient capacity in the Fort Hall main canal for Indian lands in the proposed Michaud extension.

Act of March 3, 1925 (Public 580, 68th Cong.), provided $15,000 for operation and maintenance, and $135,600 of the unexpended balance of $300,000, appropriation act of May 24, 1922, for completing construction in accordance with the provisions of this act.

Act of May 10, 1926 (Public 206, 69th Cong.), provided $33,500 for improvement, operation, and maintenance, and for completion of the enlarging, relocating, and repairing of canals, structures, and dam, and replacing of structures of the irrigation system for the irrigation of lands on the Fort Hall Reservation, Idaho, and lands ceded by the Indians of said reservation, as provided for in the act of May 24, 1922 (42 Stat. 568), the same to be reimbursed in accordance with the provisions of said act of May 24, 1922, there is hereby made available until June 30, 1927, not exceeding $40,000 of the unexpended balance of the appropriations heretofore made for this purpose in the act of May 24, 1922 (42 Stat. 568), and acts supplementary thereto, and that the remainder of the unexpended balance of said appropriation, amounting to $3,961.44, shall be covered into the Treasury and carried to the surplus fund immediately upon the approval of this act.

Act of January 12, 1927 (Public 541, 69th Cong.), provided for improvement, maintenance, and operation of the Fort Hall irrigation system, Idaho, $28,000. Also for surveys and investigations for the protection of water rights in the Blackfoot River, including investigation of any damage resulting from the operation of the Blackfoot Reservoir, $12,000, payable from funds received from the sale of excess stored waters of the Blackfoot Reservoir.

4. HISTORY

The Fort Hall Indian Reservation was established by Executive order of July 14, 1867, in pursuance of treaties of July 2 (the Fort Bridger treaty) and July 30, 1863, between the United States and the Shoshone Indians. As then defined, it extended 25 miles south from the confluence of the Portneuf and Snake Rivers, thence easterly 70 miles along the divide between the Bear and Portneuf Rivers, thence north about 40 miles to the Blackfoot River, and thence down the Blackfoot River and the Snake River to the place of beginning, and embraced an area of about 1,800,000 acres, including within its boundaries the trading post of Fort Hall, which had been established in 1834.

Construction or purchase of irrigation works authorized.—The act of Congress of August 5, 1894 (28 Stat. 305), authorized and instructed the Secretary of the Interior to contract for the construction of irrigation canals, and the purchase or securing of a water supply for lands of Fort Hall Reservation, any expenditures to be paid from money in the Treasury to the credit of the Fort Hall Indians. As a result of this, and subsequent legislation, the Idaho or Brady Canal, with a water right of 600 second-feet from Snake River—priority of December 14, 1891—was finally purchased in 1908, and is a part of the Fort Hall irrigation system.

Reservation diminished; ceded tract.—By agreement ratified by act of Congress of June 6, 1900 (31 Stat. 672), the Indians ceded to the United States for $600,000—to be paid to them or used for their benefit—a tract about 24 by 30 miles in extent in the southeast part of the reservation. With the exception of about 20,000 acres in the vicinity of Pocatello, this tract—since known as the ceded tract—is hilly or mountainous. After its purchase, and the allotment thereon of such Indians as cared to remain there, the surplus or unallotted land was opened to settlement under the terms of the homestead law except as to price, on June 17, 1902. For this land homesteaders were required to pay $10 per acre for agricultural land susceptible of irrigation from the Idaho Canal, $2.50 per acre for agricultural land not under the canal, and $1.25 per acre for grazing lands.

Preliminary surveys and estimated cost of Fort Hall project.—Act of Congress of June 21, 1906 (34 Stat. 334), appropriated $25,000 for surveys of the Fort Hall and Lemhi Reservations, and for a reconnaissance survey and preparation of plans for an irrigation and storage system for Indian and ceded lands of the Fort Hall Reservation. The following report and estimated cost of the Fort Hall project was submitted to the Commissioner of Indian Affairs January 10, 1907, by Special Agent John J. Granville, after making the surveys thus provided for.

WASHINGTON, D. C., *January 10, 1927.*

The COMMISSIONER OF INDIAN AFFAIRS.

SIR: In accordance with your request, I submit herewith an approximate estimate of the cost of constructing the necessary dam, canals, etc., for the proper irrigation of the Fort Hall Indian Reservation.

I beg to advise you, however, that this is but a rough approximation of the cost, and but little better than a guess. The plans from which a fair estimate can be made are in course of preparation, and upon their completion a full detailed report, with plans and estimates, will be submitted to you. The following estimate of cost may, however, answer your present purpose.

Estimated cost of dam, complete	$84,000
Lands to be acquired	30,000
Telephone line (50 miles)	10,000
Enlarging and rebuilding old Idaho Canal	35,000
Extending Idaho Canal from present terminus to Port Neuf River east of Pocatello	59,400
Constructing main canal on reservation to Fort Hall Bottoms	38,000
Constructing laterals on reservation	35,000
Incidentals, engineering, etc., at 10 per cent	29,140
Total estimated cost	320,540

Very respectfully submitted.

JOHN J. GRANVILLE, *Special Agent.*

The "full detailed report, with plans and estimates," referred to in the foregoing report, was submitted by Mr. Granville January 31, 1907. On page 27 of this report the estimated cost is given as $420,919.25. The report concludes with: "I believe the estimate to be conservative and that the work can be done within the estimated cost."

Action of Congress in providing for constructing the Fort Hall project was based on the first report, that of January 10, 1907, as set forth in Senate Document 230, Fifty-ninth Congress, second session, January 21, 1907, wherein it is stated: "There are about 60,000 acres of agricultural land ceded by the Indians and now owned by white people. These lands are worthless without water, so that the $6 an acre for water rights to supply these lands will bring $360,000. It afterwards developed that instead of "about 60,000 acres" there were but 12,000 acres of agricultural land in white ownership that could be included in the project then under consideration and later constructed.

In his first report Granville makes no estimate of the area. In his second report he gives the irrigable area as 42,000 acres. In his letter of February 1, 1907, transmitting to the Secretary of the Interior the report of Granville, Chief Engineer W. H. Code, Bureau of Indian Affairs, gives the irrigable area on the reservation proper as 30,000 acres, and the area of irrigable lands in the ceded tract as 12,000 acres. In view of this it is difficult to understand why the error contained in Senate document above referred to, wherein the area in white ownership was given at 60,000 acres instead of 12,000 was not noticed and corrected by the Department of the Interior.

Act of March 1, 1907 (34 Stat. 1024), authorized the Secretary of the Interior to acquire lands and construct a reservoir and enlarge any irrigation system for irrigation of Indian and coded lands of the Fort Hall Reservation; provided that the Secretary "may sell the water right for lands in private ownership" (lands homesteaded under the act of June 6, 1900) "at $6 an acre" payable in five equal annual installments; and the money so paid "shall reimburse the United States for the expenditures made thereunder"; provided that land susceptible of irrigation under the system provided, and owned by Indians in severalty or in common shall be deemed to have a right to water for irrigation "without cost to the Indians so long as the title remains in said Indians or tribe, but any such lands leased for a longer term than three years shall bear their pro rata part of the cost of the maintenance of the system that may be constructed, and when the Indian title is extinguished these lands shall also bear their pro rata cost of maintenance"; and appropriates for carrying out the provisions of this act, $350,000 which shall be reimbursed to the United States from the moneys obtained from the sale of water rights (to lands in private ownership).

Amendatory and supplementary to the foregoing, act of April 30, 1908, appropriated $100,000; and act of March 3, 1909, $100,000. The latter also provided $25,000 additional for payment of damage claims.

Act of April 4, 1910 (36 Stat. 274), appropriated $100,000 for continuing the work of constructing an irrigation system, and provided that the amount hereby appropriated, and all moneys heretofore or hereafter to be appropriated for this project shall be repaid into the Treasury of the United States in accordance with the provisions of the act of March 1, 1907: *Provided further*, That lands in private ownership shall pay only $6 per acre for water rights, including construction charges, in accordance with the act of March 1, 1907.

The act of March 3, 1911 (36 Stat. 1063), provides for the completion of construction of an irrigation system for the irrigation of lands on the Fort Hall Reservation, Idaho, and lands ceded by the Indians of said reservation, $85,000, including $10,000 for maintenance, and provides also for allotments to be made of the lands on the Fort Hall Indian Reservation.

The act of Congress of August 1, 1914 (38 Stat. 589), provided that the Secretary of the Interior may fix maintenance charges as he may direct, such payments to be available for use in maintaining the project or system for which collected: *Provided further*, That all moneys expended heretofore or hereafter under this provision shall be reimbursable where the Indians have adequate funds to repay the Government, such reimbursements to be made under such rules and regulations as the Secretary of the Interior may prescribe * * *: *Provided further*, That the Secretary of the Interior is hereby authorized and directed to apportion the cost of any irrigation project constructed for Indians * * * said cost to be apportioned against such individual Indians under such rules, regulations, and conditions as the Secretary of the Interior may prescribe * * *. In accordance with the provisions of the foregoing act of August 1, 1914, the construction cost of the Fort Hall project, as determined by the field cost accountant, was $821,681.44 on June 30, 1915.

Construction, project not completed.—Soon after beginning work, it was found that the construction of the Fort Hall project would cost many times the amount estimated. The Blackfoot Dam alone cost practically as much as Granville estimated for the entire project, and even at that—as then built—was practically useless, and, moreover, constituted a serious menace to life and property. Many other structures were unsatisfactory, and canals were of insufficient capacity or extent to serve all the land. In fact, by 1913, after an expenditure of nearly twice the estimated cost, the project was still incomplete. As the construction cost repayment collectible from privately owned lands was limited to "only $6 per acre" by the act of May 4, 1910, it was realized that further expenditure under then existing legislation would result in additional loss to the Government.

Necessity for rehabilitation and completion.—There was, however, an insistent demand that the project be rehabilitated and completed, and finally the landowners expressed their willingness to repay the Government their pro rata share of the cost of the work. Accordingly a board of engineers—Messrs. W. M. Reed, chief engineer, Bureau of Indian Affairs; J. H. Smith, State engineer of Idaho; and W. P. Havener, representing the Pocatello Water Users Association—at the request of the Secretary of the Interior reported on the work required and its probable cost. Their report was submitted September 1, 1917. As no action was then taken, the following revised estimate of cost was submitted by Supervising Engineer Henry W. Dietz September 17, 1921:

Repairs to Blackfoot Reservoir Dam	$100,000
Enlargement Idaho Canal	75,000
Eliminating leaks in reservoir	20,000
Diversion dam on Blackfoot River	10,000
Enlarging distribution system	283,000
Drainage system	88,000
Engineering and incidentals	57,500
To revision over 1917 estimates	126,500
	760,000

Act of May 24, 1922 (42 Stat. 568), provided for improvement, maintenance, and operation, $50,000, and for enlarging and repairing canals, repairing structures and dam, and replacement of structures, $300,000, to be immediately available, the total cost of the work to be done not to exceed $760,000: *Provided*, That the amount herein appropriated and the amount to be appropriated in the future for the completion of the work shall be divided equitably by the Secretary of the Interior between Indian lands and the lands in private ownership: *Provided further*, That no additional work toward the enlargement of this project, but only the necessary repairs to the present project shall be made unless and until

the Secretary of the Interior shall be able to make or provide for what he shall deem to be satisfactory agreements with such private landowners to repay their proper proportionate part of the cost of the entire work to be done: *And provided further*, That in case of lands still held in Indian ownership benefited hereby, there is created a lien against such lands for the proportionate share of the money expended hereunder, which shall be enforced against such lands by the Secretary of the Interior under such rules, regulations, and conditions as he may prescribe. Subsequent legislation, as indicated in tabulation of appropriations, made available the remainder of the $760,000 authorized.

According to departmental instructions, it was necessary to execute agreements, providing for repayment of construction work authorized by the act of May 24, 1922, with all private landowners, before any construction work could proceed. The execution of agreements was not completed until October, 1922. Soon thereafter, work was commenced on the enlargement of the Idaho (Snake River feeder) Canal, and plans formulated for other work, as tentatively outlined, in the board of engineers report. After detailed surveys and investigations had been made it was found that it would be inadvisable to enlarge the existing Fort Hall main canal, which was a continuation and enlargement of the old Idaho Canal Co.'s canal, and because of excessive curvature and gradients in this canal, it was decided to reconstruct the greater portion of the main canal on a higher location, with improved alignment. Consideration was also given to the proposed development of the Michaud tract, and extensive and fertile area of land lying between Pocatello and American Falls, which had always been considered a logical extension to the project. Provision of capacity for this proposed unit could be made more economically at this time, while construction was in progress, than in the future. Act of June 25, 1924, provided for the expenditure of approximately $100,000 from the Indian tribal funds (Fort Hall 4 per cent fund) received from the sale of Fort Hall bottoms lands for the American Falls Reservoir. Including the above tribal funds, a total of $860,000 were appropriated for carrying out the provisions of the act of May 24, 1922.

Reconstruction and enlargement work, thus provided for, was completed September, 1927, with the completion of the Williamson siphon and distributary laterals, constructed for the irrigation of about 410 acres of highly developed homestead lands in the ceded tract, formerly above the gravity laterals and partially irrigated by pumping.

Project reconstruction, enlargement, and rehabilitation work has consisted of the reconstruction and raising of the Blackfoot Dam; the construction of the China Hat Dam for the Blackfoot Reservoir; the partial development of the Grays Lake auxiliary reservoir by the construction of two small dams with timber outlet works, and the enlargement and completion of the "Clarks Cut" (artificial outlet to the Blackfoot Reservoir via Sheep and Meadow Creeks), which rights were purchased in 1908; the enlargement of the Idaho Canal (11.3 miles long) from the Snake River to the Blackfoot River, from a capacity of 300 second-feet to 850 second-feet; the enlargement of 7.1 miles of the Fort Hall Main Canal from a capacity of 350 second-feet to 1,200 second feet, and the reconstruction of the remaining 18.5 miles of the main canal on a higherlocation; the enlargement of 8 miles of principal distributary canals; the enlargement of 81 miles of laterals and the construction of 80 miles of new laterals and extensions with capacities from 10 to 120 second feet; the construction of 12 miles of drains and wasteways; the construction of approximately 1,650 concrete, metal and timber canal and lateral structures, costing from $50 to $9,000 each; and the construction of 2,960 feet of reinforced concrete pipe lines and 3,900 feet of metal pipe lines, conduits of the distributary lateral system; which have provided facilities for the irrigation of 38,300 acres of reservation lands and about 13,500 acres of homestead lands of the ceded tract. The total construction cost of the entire project to June 30, 1927, was $1,752,302.67. An appropriation of $145,000 has been authorized by the present (Seventieth) Congress, first session, for the completion of the lateral system for the remaining 10,000 acres of the Fort Hall unit. This work will be completed in the fiscal year 1929; and the completed system will provide for the irrigation of an irrigable area of 60,000 acres, at a total cost of approximately $1,817,000, or about $30.30 per acre. The total costs include an expenditure of $98,953.11 for the Michaud and other proposed units.

Water-right contracts, executed with private landowners of the ceded tract, under the provisions of the acts of Congress of March 1, 1907 (34 Stat. 1024), and April 4, 1910 (36 Stat. 274), have provided for the repayment to the United States of approximately $73,620.90. The final instalment under these provisions was due December 1, 1925, and subject to cancellation December 1, 1927.

In accordance with agreements executed with landowners under the provisions of the act of May 24, 1922 (42 Stat. 568), the first instalment of the supplemental construction cost of $15.10 per acre, which is payable in 20 annual instalments, will be due and payable April 1, 1928. The act of Congress of May 24, 1922, also provides "that this construction charge is a lien against lands in Indian ownership, collectible under such regulations and conditions as the Secretary of the Interior may prescribe."

5. LOCATION, TRANSPORTATION, AND MARKETS

State.—Southeastern Idaho.

Counties.—Irrigable area in Bingham, Bannock, and Power; storage works, Bingham, Booneville, and Caribou.

Townships.—Three to seven south, ranges 32 to 35, east of Boise meridian.

Railroads.—Oregon Short Line, Union Pacific System; 26 miles of the Montana Branch of the Oregon Short Line passes through the center of the project from Pocatello to Blackfoot; approximately 20 miles of the main Oregon Short Line, Granger to Portland, passes through the southern part of the reservation.

Highways and roads.—Old Oregon Trail and Yellowstone Highway. That part of the Yellowstone Highway (26 miles) passing through the project and approximately 4 miles of the Oregon Trail from Pocatello to American Falls is paved.

Cities and towns.—Pocatello, 20,000; Blackfoot, 5,000; American Falls, 4,000; Fort Hall, 150.—All these are railroad points.

Markets. Portland, Los Angeles, Chicago, Omaha, Denver, and Kansas City. For hay, dairy, and poultry products (local markets), Blackfoot and Pocatello. There is a sugar factory at Blackfoot.

The Indian agency and school and the irrigation project office are at Fort Hall.

6. RESERVATION LANDS AND ALLOTMENTS

Area of reservation as originally established, 1,800,000 acres.

Area of reservation at present, 471,466 acres.

(a) Area, classification, and estimated value of reservation land

Classification	Acres	Unit value	Total value
Grazing allotments	325,130	$10	$3,251,300
Irrigable allotments	33,880	100	3,338,000
Grazing (tribal)	20,000	5	100,000
Timber (tribal)	45,110	12	54,132
Irrigable land sold	3,050	100	30,500
Grazing land sold	7,640	20	152,800
Fort Hall bottom (tribal)	9,256	20	185,120
Mountainous and waste	7,400	1	7,400
Agency, town site, schools	1,180	100	118,000
	471,466		7,287,252

There are 13,500 acres of irrigable homestead land outside of the reservation known as the ceded tract. Irrigable allotments have been sold from $30 to $175 per acre ($15.10 per acre irrigation charges yet due).

(b) Classification of lands under authorized projects.—

	Acres
Indian-owned:	
Irrigable allotments	30,625
Irrigable grazing allotments	6,205
Irrigable tribal lands	7,030
Indian school and agency reserves	900
Mission schools	280
White-owned:	
Homestead—ceded tract	13,240
Purchased from Indians	2,840
Town sites	680
	[1] 62,000

[1] Subject to correction, surveys not completed. This includes 10,000 acres of irrigable tribal and grazing lands now under the constructed main canal in what is known as the Gibson division for which an appropriation of $145,000 for the completion of the lateral systm is included in the Interior Department Appropriation act for the fiscal year 1929.

(c) *Allotments.*—Allotments were begun in 1908 and completed in 1913. Each Indian living in 1908, regardless of age or sex, received an irrigable allotment of 20 acres and a grazing allotment of 160 acres. Heads of families whose consort was deceased received a 40-acre irrigable and a 320-acre grazing allotment; 1,946 irrigable allotments were made, 20 to 80 acres each, totaling 36,930 acres, and 1,946 grazing allotments, 160 to 320 acres each, totaling 332,770 acres, 1,756 irrigable allotments (33,880 acres) and 1,895 grazing allotments (325,130 acres) are now held under trust patents.

Classification	Number	Acreage	Average sale price	Approximate total sale price
Deceased Indian allotments sold to date:				
Irrigated (on project)	65	1,300	$40	$52,000
Irrigated (outside project)	9	408	25	10,200
Grazing	19	3,040	10	30,400
Fee patent allotments sold to date: [1]				
Irrigated (on project)	67	1,340	40	53,600
Irrigated (outside project)	47	2,470	25	61,750
Grazing (on project)	2	200	20	4,000
Grazing	30	4,800	10	48,000
Total	239	13,718		259,950

[1] Indians having patent in fee simple and certificate of competency.

All Indians, in accordance with the Fort Bridger treaty, received fee-patent allotments, with restrictions as to alienation and competency. Lands held in trust by the United States until Indians are granted certificate of competency. See act of February 23, 1889. (25 Stat. 687.)

7. POPULATION AND INDIAN HEALTH CONDITIONS

Indian tribes: Bannock, Lemhi, Western Shoshone.

Indian population, 1,765; white population, 1,800 (includes reservation and ceded tract; the figures are for the year 1927).

Indian births, 51; deaths, 55.

Indian families on reservation	383
Cases of tuberculosis	30
Cases of trachoma	40
Indian families living in permanent homes	220
Full-blood Indians	1,573
Less than full blood	97
Indians receiving rations	29

8. CLIMATE

Period covered by records: Blackfoot, 1897 to 1927; Fort Hall, 1914 to 1927.

Range in elevation of irrigable areas, 4,360 to 4,500 feet.

Maximum temperature, 106°; minimum temperature, 32° below zero.

Average maximum temperature, 80°; average minimum temperature, 20°.

Average annual precipitation, 10.2 inches; snow, 40 inches.

Average date last killing frost, May 15.

Average date first killing frost; fall, September 20.

Average growing season, 150 to 180 days.

There is a high percentage of sunshine during the growing season, as most of the cloudy and stormy weather occurs during the winter and early spring months. The average percentage of sunshine during the growing season is approximately 72, with an average of 63 per cent for the year.

There is a wide variation in temperature over the irrigable area, temperature at Pocatello frequently being 5° to 10° higher than at Blackfoot; also corresponding variation in dates of the first and last occurrence of frost.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(*a*) *Topography.*—A topographic survey of the project lands has been made. The topography was taken by plane-table on a scale of 400 feet to the inch and contours plotted at 2-foot intervals. Flats of each section have been traced and been filed. These form the basis of the irrigable area and classification surveys and furnish supporting data for the water users and construction repayment accounts.

The topography of the irrigated areas of the reservation, which range in elevation from 4,300 to 4,500 feet above sea level, is quite varied, consisting generally of gently sloping bench lands with occasional areas of alluvial bottom lands bordering on Lincoln, Bannock, and Ross Fork Creeks and the Blackfoot River.

In the northern portion of the project irrigable area, the slope is quite uniform to the south and west with occasional irregular areas of gently rolling ridges, isolated knolls and depressions. The southern portion of the irrigable area is broken quite frequently by isolated knolls, gently rolling ridges, and depressions with a general slope to the northwest. In this section all of the principal distributary laterals are located on the ridges with irrigation deliveries on both sides to the southwest and northeast. In this area it has required an extensive lateral system with many drops, checks, and control structures for the delivery of water to each allotment or 40-acre subdivision. A large part of the ceded tract is isolated from the main canal by a low depression across which water is conveyed by an inverted concrete siphon or pipe line 4,500 feet in length, for the irrigation of this area. Approximately 75 per cent of the irrigable area has a fairly uniform slope of approximately 8 feet per mile; the remainder is somewhat rolling and broken by ravines and ridges, with a maximum slope of about 15 per cent. The minimum slope is about 1 foot per mile.

The average cost of clearing, leveling, and plowing is approximately $30 to $40 per acre, with a minimum of about $8 per acre for the smoothest lands and a maximum of $60 per acre for the rough lands.

(*b*) *Irrigation methods and water delivery.*—The border method of irrigation on the comparatively level lands, and the furrow and corrugation methods on he more sloping lands, are the principal methods of irrigation. Some wild flooding is practiced on pasutre lands and areas bordering on some of the natural streams or ravines.

The constant flow method of delivery has been practiced for the most part up to the present on the project, principally because there is an excess water supply for the present area in cultivation. At the present time the rotation method of delivery is enforced for the distribution of water for small acreage tracts on the ceded tract, and in the vicinity of Pocatello. Water is controlled only by the ditch riders for the 40-acre tract. Delivery is made principally on demand. Irrigation heads are adjusted to suit the diversity of crops and size of farms. Farm units vary from 1 acre to several hundred, and it is therefore impossible to fix a head that would be applicable to all units. Under the system of furnishing water on demand, which is really a sort of irregular rotation scheme, the average head furnished is about 2 inches per acre, or 1 second-foot for 25 acres. Laterals and sublaterals are constructed to provide for a capacity of 1 second-foot for 20 acres. The duty in the larger laterals varies from 1 second-foot to 30 acres to a maximum in some cases of 1 second-foot for 50 acres in the principal distributary canals.

(*c*) *Duty of water.*—The duty of water for the project as a whole is approximately 5½ to 6 acre-feet per acre at river diversion, or from 2½ to 4½ acre-feet on the farm. Because of the ample water supply for the project, no attempt has been made to curtail the use of water as long as it has been beneficially applied to lands. The average duty of water on the silt and loam soils of the ceded tract and that portion of the reservation south of Moss Fork Creek, is approximately 2½ to 3½ acre-feet per acre for 9,200 acres. On approximately 9,350 acres of gravelly soil in the Gibson division, the average duty of water at the farm is approximately 4.4 acre-feet per acre.

(*d*) *Soil.*—No detailed soil surveys have been made, but several cursory investigations indicate that the soils are principally aluminum, magnesium, and calcareous silicates of alluvial character, varying from a fine, light-grayish, clay soil to coarse sandy (volcanic sand) soils and fine sandy loams. The soils of most of the bench lands are relatively fine and calcareous, and quite suitable for irrigation farming and cultivation. The native vegetation is grass and sagebrush.

The sandy loams in the Blackfoot River area in the north, Ross Creek area in the central portion, and the fine, silty loams of the Tyhes district in the south, are generally considered to be the more fertile and most productive lands, yield-

ing excellent crops of potatoes, sugar beets, alfalfa, alfalfa seed, peas, grain, and garden products. The soils of the project may be roughly classified as follows:

Soil	Area	Depth	Subsoil	Average annual acre crop value
Fine sand and silty loam	25,000	4 to 20 feet	Bowlders and gravel	$40-100
Sandy loam	10,000	do	Sand and gravel	25- 70
Coarse sand and loam	10,000	2 to 10 feet	Gravel	25- 40
Sand gravel and lea	10,000	1 to 4 feet	do	25- 50
Volcanic and sandy loam	5,000	4 to 20 feet	Sand and gravel	25-100

(*a*) *Drainage.*—The project lands have excellent drainage conditions, both surface and subsurface, being underlaid with a strata of course sand and gravel, favorable for subsurface drainage and a relatively low underground water table. The gravels provide a ready exit for ground water to the Snake River bottoms, below the irrigable area, in the west.

Practically none of the irrigable area is adversely affected by alkali or other injurious salts, or by seepage. Because of the excellent drainage conditions, the coarseness of the terrace alluvium, and the close proximity of irrigable lands to the steep bluff forming the western border, it is improbable that the lands of this project will ever become water-logged or require extensive artificial drainage.

The drainage ditches on the project are primarily wasteways and surface drains. There are 16 miles of drains and wasteways—3.2 miles with a capacity of 1,000 second-feet or more; 8.8 miles, capacity 250 to 1,000 second-feet; and 15 miles with a capacity of 15 to 50 second-feet; with depths varying from 4 to 8 feet below the natural ground surface, constructed at a total cost of $31,860.16.

10. WATER SUPPLY AND WATER RIGHTS

Sources of supply: Snake and Blackfoot Rivers and Gray's Lake.

(*a*) *Snake River*

Average annual run-off	acre-feet	4,756,000
Average discharge	second-feet	15,000
Available for Fort Hall project [1]	do	600
Minimum annual supply (1924)	acre-feet	67,676
Maximum annual supply (1925)	do	175,000
Average safe annual supply	do	127,000

(*b*) *Blackfoot River*

Area drainage basin	square miles	1,020
Area drainage basin above reservoir	do	666
Average annual run-off	acre-feet	253,000
Average safe annual supply	do	166,000
Storage, Blackfoot Reservoir, capacity	do	410,000

(*c*) *Gray's Lake* (*natural marsh and lake basin.*—Prior rights purchased in 1908, supplemented by filing made by United States under State laws.

Estimated total annual safe supply, 300,000 acre-feet.

Water rights.—With the purchase of the Idaho Canal in 1908 from the Idaho Canal Co., the United States acquired a right to 600 second-feet of Snake River water, with a priority of December 14, 1891, by a court decree. (Case: Rexberg Irrigation Co. *v.* Teton Irrigation Co., sixth judicial district, Idaho, tried in 1911.)

This right in average years is good until late in July or early August. In 1924 this right was cut off entirely on July 4; in 1926 on July 7. In 1925 and 1927 the Snake River water right was in effect practically the entire irrigation season.

Under State permit 3117, the United States claims the right to all surplus waters, above the amounts required to satisfy decreed rights and other licensed rights with earlier priorities, of the Blackfoot River during the irrigation season.

In addition to the above rights, the United States acquired with the purchase of lands for the Blackfoot Reservoir, decreed water rights amounting to 29.8 second-feet. Rights for a portion of the lands watered by the Blackfoot River

[1] Priority by court decree, dec. 14, 1891, diverted near Shelley, Idaho, through Idaho Canal to Blackfoot River.

were established by the court decree in the "Stevens Case" of August 1, 1891, but there has been no court adjudication of water rights since that time, and many conflicting water rights claims on the Blackfoot River have arisen.

All project lands have the same status as to water rights. In other words, if the water supply was insufficient to supply all lands, the supply available would be proportioned to each user on a basis of the acreage in cultivation. Water-right contracts executed with the white landowners on the Ceded Tract, under the act of Congress of March 1, 1907 state that "the quantity of water to be furnished thereunder shall be three acre-feet per annum per acre of irrigable land, measured at the land, or so much thereof as shall constitute a proportionate share per acre of the water supply actually available for lands under said project."

Other reservation water rights.—Water rights for the other minor irrigation units on the reservation, and not operated by the Fort Hall project, are generally supplied from streams that are entirely on the reservation, and no filings on these have been recorded with the State. This is particularly true of the lands irrigated by Lincoln Creek, lands on the upper portion of the Fortneuf River and the Upper Ross Fork Creek or Buckskin Basin area, which is irrigated from Ross Fork Creek. The Bannock Creek area is irrigated by small ditches diverting principally from the West Fork near the south boundary of the reservation. The waters of Bannock Creek were adjudicated by decree of the United States court, dated April 9, 1907. The Indians of the Fort Hall Reservation were awarded a prior right to 16¾ second-feet of water from Bannock Creek, dating from April 1, 1887. Settlements on public lands on the head of Bannock Creek south of the reesrvation boundary, were awarded junior rights, aggregating 19.6 second-feet.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

The irrigation plan of the Fort Hall project, so far approved, provides for the storage of flood waters of the Blackfoot River in the Blackfoot Reservoir, capacity 410,000 acre-feet (cost $438,476.42), and Gray's Lake, capacity 40,000 acre-feet, located near the headwaters of the Blackfoot River. Storage water released from the reservoir is conveyed down the river channel 58 miles to the Fort Hall Main Canal diversion dam. Blackfoot River water is also supplemented by Snake River water supplied through the Idaho Canal, capacity 850 to 1,100 second-feet, length 11.4 miles (purchased 1908, enlarged 1923, cost with water rights $256,353.74), which diverts from Snake River about 1½ miles southwest of Shelley, Idaho and discharges into the Blackfoot River about 7 miles above the main canal diversion. The last 3.1 miles of this canal carry the waste waters of Sand Creek for which additional carrying capacity was provided for by contracts executed in 1924 (approved April 1926), with several private irrigation districts and canal companies.

Water is diverted from these two diversion dams on the south side of the Blackfoot River to supply an area of approximately 62,000 acres extending from the Blackfoot River on the north, to the city limits of Pocatello and the Portneuf River on the south. The Fort Hall Michaud Main Canal, length 25.3 miles, capacity 580 to 1,400 second-feet, total cost $427,766.44 (partially constructed by the Idaho Canal Co., 1898, extended and completed by United States 1908–1910, enlarged, relocated, and reconstructed 1924–25, with capacity to irrigate additional area of 26,600 acres in proposed Michaud unit) now provides for the irrigation of approximately 26,000 acres of Indian lands in the reservation, and 13,500 acres of white-owned homestead lands of the ceded tract outside of the reservation.

Possible future improvements may include the construction of a more satisfactory dam to provide a better diversion for the Main Canal; and an equalizing reservoir to utilize and regulate fluctuating inflows to the Blackfoot River, particularly those of Sand Creek.

Probable future development may also include the extension of the Fort Hall Michaud Main Canal by a pipe line across the Portneuf River to irrigate the proposed Michaud unit (reservation lands) lying west of the Portneuf River and bordering on the south side of the American Falls Reservoir; and possibly the construction of another diversion dam on the Blackfoot River about 16 miles below the Blackfoot Reservoir Dam, a diversion canal across Deadman Pass to the head-waters of the Portneuf River, a tunnel to Danielson Creek, then conveyed in Ross Fort Creek to two canals for the irrigation of Indian lands in

Buckskin Basin and Lincoln Creek, and homestead lands of the Pocatello Bench; contemplating the ultimate irrigation of an additional 50,000 acres, included in six units of this proposed scheme at a probable cost of approximately $3,249,000.

12. Summary of project works

Canal structures—	
Concrete:	
Lateral headgates	28
Wastegates	5
Turnouts	13
Check-turnouts	91
Drops	48
Bridges	11
Pipelines	2
Wood:	
Bridges	119
Culverts	29
Checks	167
Weirs	60
Turnouts	410
Metal:	
Turnouts	281
Culverts	67
Pipeline	1

Canals

	Miles
Capacity, 1,000 second-feet or more	18
Capacity, 500 to 1,000 second-feet	22
Capacity, 250 to 500 second-feet	10
Capacity, 100 to 250 second-feet	13
Capacity, 50 to 100 second-feet	27
Capacity, 15 to 50 second-feet	55
Capacity less than 15 second feet	92
Total	237

13. AREA AND UTILIZATION OF ARABLE AND IRRIGABLE LANDS

Utilization of Government project lands

	1925	1926	1927
Acreage arable (estimated)	50,000	50,000	60,000
Acreage irrigable	48,000	50,000	50,330
Acreage irrigated	28,012	29,058	27,055
Acreage cultivated	26,025	[1] 28,362	26,354
Total crop value	$1,195,194.00	[1] $658,602.00	$846,127.00
Average acre crop value	$45.85	[1] $30.27	$32.12
Indians farming	253	256	260
Lessees farming	56	80	93
White owners farming	240	256	299

[1] 1926 includes irrigated Indian pasture and meadow.

Acreages arable and irrigable not definitely fixed, as surveys are not completed and project being extended to take in new lands. Irrigable area is the estimated area under constructed canals.

Estimated total arable area was increased 10,000 acres in 1927 because of the authorization of Congress of funds for the remainder of the unirrigated portion of this project.

The 1925 crop valuation includes dairy and poultry products. Estimated at approximately $100,000.

	1925	1926	1927
Utilization of land owned by Indians and not leased—Government project			
Acreage arable.[1]			
Acreage irrigable	27,424	28,602	27,925
Acreage irrigated	9,322	9,359	7,339
Acreage cultivated	7,655	7,359	7,339
Families farming	220	223	249
Irrigated per family	42	40	30
Cultivated per family	35	35	30
Total crop value	[2] $202,898.00	[2] $118,433.00	[2] $114,842.00
Crop value per acre	$26.48	$16.09	$15.69
Crop value per family	$922.00	$531.00	$462.00
Utilization of land owned by Indians and leased—Government project			
Acreage arable.[1]			
Acreage irrigable	5,620	6,222	6,608
Acreage irrigated	5,292	5,768	6,408
Acreage cultivated	4,781	5,760	5,862
Number of lessees	56	80	93
Total crop value	$223,549.00	$185,963.00	$177,968.00
Crop value per acre	$46.78	$32.58	$30.36
Utilization of land owned by whites—Government project			
Acreage arable.[1]			
Acreage irrigable	14,956	15,176	15,197
Acreage irrigated	13,398	13,931	13,308
Acreage cultivated	13,589	13,243	13,153
Number of owners	240	256	299
Total crop value	$725,307.00	$536,484.00	$553,317.00

[1] Acreages arable and irrigable not definitely fixed, as surveys are not completed and project is being extended to take in new lands. Irrigable area is the estimated area under constructed works.
[2] 1925 crop valuation includes dairy and poultry products. The total area of irrigable land owned by Indians is covered by leases.

Utilization of land, Lincoln Creek, and Little Indian Canal units (irrigation ditches maintained by Indians and lessees with the assistance of agency farmers, 1927):

Acreage arable (estimate)	4,800
Acreage irrigable (estimate)	1,750
Acreage irrigated (estimate)	1,650
Acreage cultivated (estimate)	1,650
Indians farming (total population)	63
Estimated par acre value of Indian crops	$15
Others farming (lessees)	8
Estimated per acre value others crops	$35

Utilization of land, Buckskin Basin unit (Ross Fork) (irrigation ditches maintained by Indians):

Acreage arable (estimate)	12,000
Acreage irrigable (estimate)	1,500
Acreage irrigated (estimate)	1,320
Acreage cultivated (estimate)	1,320
Indians farming (total population)	180
Estimated per acre value of Indian crops	$15

Utilization of land, Bannock Creek unit (irrigation ditches maintained by Indians):

Acreage arable (estimate)	5,000
Acreage irrigable (estimate)	2,080
Acreage irrigated (estimate)	1,354
Acreage cultivated (estimate)	1,223
Indians farming (total population)	280
Estimated per acre value of Indian crops	$15

14. Principal crops, crop yields, and returns

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre	Total value
Detailed crop data project lands irrigated (1927) Indian farmers					
Alfalfa	5,020	1.70	$8.00	$13.58	$68,176.00
Barley	65	25.29	.70	16.25	1,756.00
Beans	14	6.00	2.92	17.51	245.20
Beets, sugar	10	1.50	7.50	11.25	112.50
Corn, Indian	17			8.22	140.00
Garden	18			50.00	900.00
Hay, other	183	1.08	5.35	5.79	1,059.00
Oats	324	18.73	.50	9.37	3,035.00
Pasture	406			3.23	1,311.00
Potatoes, white	209	199.29	.34	67.34	14,073.60
Wheat	1,447	15.69	1.00	15.69	23,709.00
Miscellaneous	77			12.00	924.00
Total	7,339			15.65	114,841.3[1]
Lessees and white owners on reservation[1]					
Alfalfa	3,066	2.14	9.00	19.30	59,166.00
Alfalfa seed	87	6.21	17.88	110.98	9,655.20
Barley	197	24.52	.70	17.16	3,381.00
Beans	52	12.54	2.92	24.70	1,804.00
Beets	119	3.79	7.50	28.42	3,382.50
Clover seed	38	4.92	15.00	73.82	2,805.00
Corn, Indian	63	13.14	1.00	13.14	828.00
Garden	15			50.00	750.00
Hay, other	3	2.67	9.00	22.50	67.50
Oats	264	22.31	.50	11.15	2,944.50
Pasture	435			3.57	1,552.50
Peas	19	6.50	2.00	12.10	230.00
Potatoes, white	1,273	238.70	.34	80.21	102,111.40
Wheat	2,040	22.32	1.00	22.32	45,525.00
Miscellaneous	95			14.00	1,330.00
Total	7,766			30.33	235,532.60
White owners (ceded tract)[2]					
Alfalfa	3,712	2.79	9.29	25.89	96,110.50
Alfalfa seed	59	1.68	17.88	30.00	1,770.00
Barley	216	27.52	.70	19.26	4,160.80
Beans	121	14.33	2.92	41.85	5,063.28
Beets	364	11.73	7.50	87.96	32,017.50
Clover seed	15	5.00	15.00	75.00	1,125.00
Corn, Indian	112	19.10	1.00	18.10	2,027.00
Garden	179			116.51	20,855.85
Hay, other	57	3.88	10.00	38.77	2,210.00
Oats	551	36.12	.50	18.06	9,952.00
Pasture	873			5.00	4,365.00
Peas	159	87.35	2.00	174.70	27,777.00
Potatoes, white	2,457	257.18	.34	87.44	214,843.96
Wheat	2,325	31.18	1.00	31.18	72,495.00
Miscellaneous	49			20.00	980.00
Total	11,249			45.63	495,752.89
Total for project	26,354			32.12	846,126.79
Detailed crop data project lands irrigated (1920)—Indian farmers					
Alfalfa	4,687	2.73	7.00	19.11	89,523.00
Garden	85			50.00	4,250.00
Oats	660	23.70	.37	8.77	5,800.12
Pasture	2,000			[3] 2.50	5,000.00
Potatoes	78	89.70	.75	67.30	5,250.00
Wheat	1,772	6.51	1.08	7.03	12,454.56
Miscellaneous [4]	77			15.00	1,153.00
Total	9,359			13.19	123,432.68

[1] Includes 2,620 acres of purchased land, crop production slightly greater than lessees.
[2] Area does not include 701 acres in townsites, lawns, etc.
[3] This amount does not include proceeds of late fall and winter pasturage on alfalfa fields, which in many cases, amounts to $2.50 per acre.
[4] Livestock sold by Indians, $61,475.

14. Principal crops, crop yields, and returns—Continued

Crop	Acreage	Average yield per acre	Average price per unit	Average value per acre	Total value
Lessees and white owners on reservation					
Alfalfa	3,535	2.38	[5] $7.00	$16.66	$58,632.00
Alfalfa seed	33	3.21	20.34	65.29	2,156.04
Barley	157	16.78	.56	9.39	1,471.12
Beets, sugar	67	2.91	6.00	17.46	1,170.00
Corn	40	20.95	.60	12.57	502.80
Garden	61			60.00	3,660.00
Oats	380	28.40	.37	10.51	3,995.26
Pasture	442			[6] 6.00	2,652.00
Potatoes	1,098	120.73	.75	90.55	99,418.50
Wheat	2,209	17.95	1.08	19.39	42,836.04
Miscellaneous	97			15.00	1,455.00
Dairy and poultry					12,500.00
Total	8,119			28.38	230,448.76
White owners (ceded tract)					
Alfalfa	4,564	3.04	[5] 8.00	24.32	110,992.00
Alfalfa seed	24	3.75	20.34	76.27	1,830.60
Barley	104	25.82	.56	14.48	1,505.28
Beets, sugar	403	1.41	6.00	8.46	3,414.00
Corn	53	15.70	.60	9.42	498.60
Garden	220			101.40	33,306.00
Oats	583	35.08	.37	13.25	7,730.04
Pasture	907			[6] 10.00	9,070.00
Potatoes	1,648	202.00	.75	151.50	249,891.50
Wheat	2,295	20.65	1.08	22.30	51,256.80
Miscellaneous	83			15.00	1,245.00
Dairy and poultry					45,000.00
Total	10,884			46.37	594,718.82
Total for project				30.27	858,601.26

[5] Reported average return on total crop raised. No. 1 potatoes were sold at $1.35 per bushel.
[6] This amount does not include proceeds of late fall and winter pasturage on alfalfa fields, which, in many cases, amounts to $2.50 per acre.

15. Economic conditions among project farmers

Indians	1924	1925	1926	1927
Number of Indian farms	241	253	287	309
Indian families farming	215	220	223	249
Livestock:				
Horses	(1)	(1)	1,100	1,068
Cattle, beef	(1)	(1)	3,000	2,167
Cattle, dairy	(1)	(1)	50	89
Sheep	(1)	(1)	100	154
Hogs	(1)	(1)	83	95
Estimated value livestock per farm [2]	(1)	(1)	$500	$500
Equipment:[2]				
Plows	(1)	(1)	(1)	$23,700
Mowers	(1)	(1)	(1)	$24,885
Tractors	(1)	(1)	(1)	$2,400
Trucks	(1)	(1)	(1)	$8,400
Autos	(1)	(1)	(1)	$30,000
Estimated value equipment per farm	(1)	(1)	(1)	$400
Acreage farmed by Indians	7,249	7,655	7,359	7,339
Acreage farmed per family	34	42	40	30
Average crop value per acre	$18	$26	$16	$15
Average crop value per family	$670	$922	$531	$462
Per acre construction assessments against Indians	None.	None.	None.	None.
Per acre operation and maintenance assessments against Indians	None.	None.	None.	None.
Acres Indian land leased:				
Irrigated	5,620	5,292	5,768	6,408
Not irrigated	1,080	1,008	1,032	1,192
Average rental per acre:				
Irrigated	$3.00	$4.00	$5.00	$5.00
Not irrigated	$0.25	$0.25	$0.25	$0.25
Approximate total rental	$17,130	$21,420	$29,298	$32,538

[1] No data. [2] Data furnished by the office of the superintendent of Fort Hall.

15. Economic conditions among project farmers—Continued

Indians	1924	1925	1926	1927
Indian land sold:				
Irrigable.....acres	1,835	2,130	2,360	2,840
Not irrigable.....do	185	210	250	319
Average price per acre:				
Irrigable	$40	$40	$40	$40
Not irrigable	$10	$10	$10	$10
Approximate total sale price to date	$75,250	$87,300	$96,900	$105,830
Number Indians receiving payments from timber, agricultural, and grazing leases, oil, power, etc.[2]	(1)	(1)	1,800	1,700
Average per capita payment to Indians from above sources (annual)[3]	(1)	(1)	$15	$15
Average total payment from above sources (annual)	$27,000	$27,000	$27,000	$27,000
Indian reimbursable indebtedness[2]	(1)	(1)	$50,000	$50,000
Amount paid on reimbursable indebtedness[2]	(1)	(1)	$5,000	$5,000
Number Indians receiving rations	(1)	(1)	29	29
Indian tribal fund[2]	$700,000	$600,000	$600,000	$600,000

[1] No data.
[2] Data furnished by the office of the superintendent of Fort Hall.
[3] Average annual per capita payment to Indians from all sources, $200.

Source of tribal fund: Grazing and farming permits and proceeds from sale of Fort Hall Bottoms land.

White landowners and lessees

Stock and equipment, 1927 (264 farms):	
Horses	1,096
Mules	19
Cattle, beef	320
Cattle, dairy	1,125
Sheep	5,927
Hogs	1,440
Fowls	14,701
Hives of bees	506
Silver-tip foxes (value $81,575)	251
Value of farm equipment	$128,963

16. PROJECT OPERATION AND MAINTENANCE

(*a*) *Organization.*—Project engineer, salary, $3,300; duties, general supervision of project and preparing plans, budgets, reports, and correspondence.

Water master, salary, $2,100; duties, direct supervision of water distribution, ditch riders, water measurement, and maintenance.

Instrument man, salary, $2,100; duties, hydrographer, surveys of irrigable areas, lateral locations and extensions, and for Indian farm ditches.

Reservoir superintendent, salary, $1,620; duties, gate tender for two reservoirs, reservoir maintenance work, custodian of Government property and lands.

Clerk-timekeeper, salary, $1,500; duties, timekeeper, project and water-users' records, equipment and material records.

Caretaker, salary, $1,320; duties, buildings and grounds, yardmen and warehouseman, checking out supplies, garage attendant, miscellaneous small repairs.

Ditch rider, salary, $150 per month; employed from 8 to 10 months a year; duties, patrols 29 miles of canals, 152 deliveries in the Blackfoot district, area 7,670 acres.

Ditch rider, salary, $150 per month; duties, patrols 28 miles of canals; 132 deliveries in the Gibson district; area, 10,450 acres; employed from six to eight months each year.

Ditch rider, salary, $135 per month; duties, patrols 20 miles of canals and 113 deliveries in the Ross Fork district, area 6,390 acres; employed from six to eight months each year.

Ditch rider, salary, $135 per month; duties, patrols 22 miles of canals, 124 deliveries in the South Reservation district, area 4,560 acres; employed six months each year.

Ditch rider, salary, $150 per month; duties, patrols 20 miles of canals; 128 deliveries in the Tyhoe district, area 5,570 acres; employed eight months each year.

Ditch rider, salary $150 per month; duties, patrols 27 miles of canals; 124 deliveries in the Port Neuf district, area 6,190 acres; employed from 8 to 10 months each year.

Ditch rider, salary, $150 per month; duties, patrols 19 miles of canals and 46 deliveries in the main canal, area 3,040 acres; also canal regulation; employed from six to eight months each year.

Ditch rider, salary, $150 per month; duties, patrols 23 miles of canals and 156 deliveries in the Pocatello district, area 5,790 acres; employed from 8 to 10 months each year.

Ditch rider, salary, $135 per month; duties, patrols 15 miles of canals and 41 deliveries in the Mission district, area 2,340 acres; also regulates Blackfoot River dams and canal diversions; employed six months each year.

Ditch rider, salary $135 per month; duties, patrols 12 miles of canals, Idaho (Snake River feeder) Canal; no deliveries; regulates Snake River diversions; gage reader for three measuring stations—Sand Creek inflow, inflow to Blackfoot River, and Blackfoot River at Presto (above all diversions).

All ditch riders use horses and are required to furnish and feed their own horses. They are employed as ditch riders from six to eight months of the year. During the remainder of the year they are employed part time on a daily basis as laborers on maintenance work and cleaning when weather conditions are suitable.

No perquisites of any kind are furnished ditch riders. Six ditch riders are required to live in Government residences, located at control and regulation points, for which a monthly rental of $15 is deducted from their salaries.

Foreman, salary, $150 per month; duties, maintenance work, repair of head gates, small structures, and telephone lines; employed six months each year.

Foreman, salary $150 per month; duties, maintenance, structure crew, repairs and replacement, concrete and timber canal structures; also employed part time in winter months on equipment repairs.

Foreman,[1] salary, $150 per month; duties, employed as required on large canal-cleaning operations with team forces; and on lateral construction and extension.

Ruth dredge operators (Indian), salary, $150 per month; duties, operation of dredging machines for canal cleaning; part time in winter overhauling and repairing machines.

Blacksmith and mechanics,[1] salary, $6 per day; employed as required.

Laborers at a salary of from $3 to $4 per day and teams and drivers at $5 to $6 per day are employed as required. The approximate annual irregular labor amounts to 3,400 man-days, $15,165; and 1,700 team-days, $10,218.

(b) Operation and maintenance annual cost

Blackfoot Reservoir	$4, 779. 94
Blackfoot River water distribution	2, 340. 52
Idaho Canal	2, 749. 06
Drains and wasteways	1, 621. 95
North (lower) Canal	3, 594. 71
North (lower) Canal distribution system	11, 342. 04
Fort Hall Main Canal	7, 914. 36
Main Canal distribution system	22, 803. 94
Surveys and investigations	62, 645. 07

The above annual expense may be divided approximately as follows:

Operation, patrolling canals	$13, 335
Maintenance, canals and structures, and cleaning	26, 925
Cutting brush, burning weeds	2, 990
Canal betterments	5, 520
Roads and bridges	1, 550
Repairing breaks	1, 760
Miscellaneous repairs, telephone lines, and equipment	2, 820
General and administration expense	7, 600
Total	62, 500
Average annual operation and maintenance cost for 5 years	59, 102
Average operation and maintenance cost per acre, irrigable	1. 18
Average operation and maintenance cost per acre, cultivated	2. 01
Average maintenance cost per mile of canals and laterals	[2] 139. 00
Average operation cost per mile of canals and laterals	[2] 110. 00

[1] Some construction work now in progress. Foreman and others employed only on maintenance work when required.

[2] Does not include 16 miles of wasteways and drains.

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(a) Construction cost to June 30, 1927

Reimbursable appropriations:	
Congressional appropriations	$1,488,234.55
Indian Office (1884)	22,098.90
Supervising engineer's office (prorated)	9,225.85
Total reimbursable	1,519,559.34
Tribal funds expended	219,070.99
Nonreimbursable expenditures	10,655.80
Total from construction to June 30, 1927	1,749,286.13
Improvements under annual operation and maintenance appropriations charged to construction	3,016.54
Total construction cost to June 30, 1927	1,752,302.67

The construction expenditure as indicated in the summary of construction appropriations following may also be shown as follows:

Total construction expenditure under act of Mar. 1, 1907	$741,353.10
Total construction expenditure under act of May 24, 1922, to June 30, 1927	746,881.45
Expenditure prior to 1907 charged to construction	24,818.10
Tribal funds expended prior to 1907 and charged to construction	121,120.45
Tribal fund expended for Michaud unit	97,950.54
Expenditures and charges to construction from other appropriations	20,179.03
Total construction cost to June 30, 1927	1,752,302.67

Out of the foregoing costs, $1,653,349.56 was the cost of construction for then authorized Fort Hall project of 52,000 acres; $97,950.54 the cost of construction, in providing main canal capacity for the proposed Michaud unit, and $1,002.57 miscellaneous construction expenditures for other minor reservation irrigation units.

Fort Hall construction expenditures include a total of $145,938.55, expended prior to the organization of the irrigation project under the act of March 1, 1907 (34 Stat. 1024), and represents some questionable construction costs, which may not be properly chargeable to project construction. These costs were set up in the project ledgers by cost Accountant Franklin in 1915, who refers to Public Document No. 1268 as authority for these charges. Records available indicate that about $67,500 of this amount are payments to the Idaho Canal Co. for water service, prior to the purchase of this canal by the Government in 1908. Other charges cover miscellaneous irrigation work on the reservation under the direction of the Indian agent. Approximately $121,120 of the foregoing expenditure was made from tribal funds.

(b) Construction costs by divisions with estimated cost to complete

Fort Hall unit:	
Construction cost to June 30, 1927	$1,653,349.56
Construction cost per acre (50,330 acres)	32.85
Estimated construction cost completed	1,817,000.00
Estimated construction cost per acre as now authorized for 60,000 acres	30.30
Michaud unit: Total construction cost to June 30, 1927 (24,000 acres)	97,950.54
Other reservation units: Total construction cost to June 30, 1927	[2] 1,002.57

Estimated per acre cost of completed project

Fort Hall unit (present authorized project)	[3] $32
Michaud unit (proposed, 24,000 acres)	$58
Buckskin Basin unit (proposed, 12,000 acres)	$62

[2] Early expenditures by Indian agency apparently not a matter of record.
[3] To include prorata cost of proposed Blackfoot River and Grays Lake improvement work, a portion of which will be properly chargeable to Michaud unit.

Pocatello bench unit (proposed, 8,000 acres)	$92
Little Indian unit (proposed, 2,800 acres)	$25
Lincoln Creek unit (proposed, 2,000 acres)	$62
Total cost of completed project (estimated)	$5, 000, 000
Estimated total ultimate arable area—acres	110, 800

(*c*) *Collection of construction cost.*—Total construction collections to June 30, 1927, under the act of March 1, 1907, amounted to $73,620.90. Total collections under this act will amount to approximately $75,000 (final installment delinquent after December 1, 1927). Supplemental construction assessments of $15.10 per acre, payable in 20 annual installments, against all lands, both Indian and white, will begin April 1, 1928, in accordance with the provisions of the act of Congress of May 24, 1922. (42 Stat. 568.)

(*d*) *Operation and maintenance cost to June 30, 1927*

Reimbursable appropriation expenditures:	
Congressional	$251, 445. 28
Office supervising engineer (prorated)	26, 290. 00
Office chief engineer	4, 944. 61
Indian office	187. 23
Total reimbursable	282, 867. 12
Nonreimbursable appropriation expenditures:	
Congressional	289, 407. 04
Increased compensation (Indian Office)	12, 282. 88
Purchase and transportation (Indian Office)	205. 23
Retirement deductions	886. 07
U. S. Treasury	2, 098. 39
Miscellaneous	5, 605. 61
Total nonreimbursable	310, 485. 22
Tribal fund expenditures	2, 910. 34

(*e*) *Operation and maintenance collections to June 30, 1927*

Collections	263, 063. 88
Total operation and maintenance expenditures to June 30, 1927	859, 326. 56

Under the provisions of the act of March 1, 1907 (34 Stat. 1024), there are no operation and maintenance charges against lands in Indian ownership and farmed by the Indians. Annual congressional appropriations provide funds for operation and maintenance expenditures for Indian lands. Operation and maintenance charges are collected from the losses of Indian lands who lease for a period of three years or more (as provided by the act of March 1, 1907). White landowners are assessed operation and maintenance charges in accordance with instructions of the Secretary of the Interior under authority of the act of Congress of August 1, 1914. (36 Stat. 589.)

A uniform operation and maintenance assessment per acre per calendar year is made for all project lands and collected in advance in accordance with departmental orders approved by the Secretary each year. Assessments are levied March 1 and due April 1; water service being withheld to enforce collection.

The per acre assessment rate for the current year is determined by dividing the total operation and maintenance cost for the previous calendar year by the total irrigable area under constructed canals.

Average area assessed for operation and maintenance charges—acres	17, 500
Average annual operation and maintenance collections	$25, 000
Total operation and maintenance assessments to June 30, 1927	336, 801
Total operation and maintenance collections to June 30, 1927	332, 279
Total operation and maintenance collections from landowners	257, 530
Total operation and maintenance delinquencies to June 30, 1927	4, 523
Total operation and maintenance collections from lessees	56, 015

	1924	1925	1926
Per acre operation and maintenance assessments:			
On Indian land not leased	None	None	None.
On Indian land leased	$1	$1	$1.
On white-owned land	$1.25	$1.20	$1.25.
Operation and maintenance collections:			
On Indian land not leased	None	None	None.
On Indian land leased	$5,451	$6,517	$6,976.
On white-owned land	$16,507	$19,411	$18,692.
Operation and maintenance delinquencies:			
On Indian land leased	$995	$517	$1,324.
On white-owned land	$5,585	$3,780	$3,057.
Rate of penalties on delinquencies	5 per cent, first month		
Do	1 per cent thereafter	1 per cent	1 per cent.

18. PROJECT DEFECTS, PROBLEMS, AND COMPLAINTS

Errors in original project plans and construction.—A considerable part of the project construction expenditure is the cost of reconstruction or rehabilitation, due to the lack of foresight and intelligent planning of the project system when originally constructed. The greater part of the reconstruction expenditure of approximately $760,000 under the act of May 24, 1922, was principally for the purpose of rehabilitating and enlarging the existing and inadequate irrigation system. The defects and the reconstruction of the two largest features of the project, the Blackfoot Dam and the Fort Hall main canal, are described in detail on preceding pages. But little attention was given to the design and planning of the lateral system. Estimates of cost were woefully inadequate, and in an attempt to economize in construction, many of the principal canal and lateral structures as first built were not of adequate capacity. The principal laterals were constructed with excessive gradients, with the result that destructive erosion occurred, making it necessary to construct many control structures to prevent erosion and to permit the delivery of water. It was also necessary to replace several concrete structures because of inadequate capacity and partial failure of old structures. In most cases replacement work involved the total loss of the original structure, partially because of improper design and inadequate capacity, but principally due to the deterioration and failure of the original concrete work.

Practically all of the concrete construction work done during the period of original construction was of inferior quality, indicating poor workmanship, the use of poor aggregates and improper methods of mixing and placing. Very little, or no steel reinforcement was used, gravity type walls being the principal mode of retaining-wall construction. It is now apparent, that considering the lack of knowledge and experience of the earlier engineers with concrete construction, that it would have been far more economical, and just as satisfactory to have constructed all lateral control structures of timber. Even at the present time where lands are not fully developed, and where conditions are suitable, it is considered that the construction of timber lateral structures is good irrigation practice, and more suitable to the economic conditions of most irrigation enterprises in this section of the country.

Water-right contracts for new lands added to the project.—Approximately 566 acres of white-owned lands in the ceded tract, and approximately 450 acres in grazing and tribal lands on the reservation, were made irrigable by reason of the main canal relocation and reconstruction work completed December, 1925. Shortly after the supplemental construction work involving the enlargement and rehabilitation of the Fort Hall irrigation system, authorized by the act of Congress of May 24, 1922 (42 Stat. 568), was undertaken, it was decided by the Indian Bureau that all new lands added to the project, or lands previously too high to be irrigated by gravity that were made irrigable by reason of project reconstruction work, should be charged the pro rata per acre share of the entire cost of project construction, which was estimated at approximately $35 per acre. A contract form for these lands was drafted March 19, 1926, and the signatures of the landowners secured during April and up to June, 1926. The contracts were submitted to the Commissioner of Indian Affairs for approval on June 8, 1926. Several landowners who had formerly irrigated a portion of their lands by pumping, refused to sign the new contracts. A portion of their lands had secured water rights in accordance with the provisions of the acts of Congress of March 1,

1907, and April 4, 1910, and in some cases all of the lands were covered by the supplemental construction agreements in accordance with the act of May 24, 1922. Water service was withheld to enforce the signing of new contracts. The Commissioner of Indian Affairs, on July 3, 1926, instructed the supervising engineer to deliver water and submit a detailed report on this matter. Two detailed reports on this matter were submitted under date of July 7, 1926, and October 2, 1926. This matter has also been referred to in several letters and reports since that time. No action has been taken by the Indian Office.

The initial installment of construction charges, under the act of May 24, 1922 (42 Stat. 568), will be due and payable April 1, 1928, and further action on this matter should not be delayed, because it will be necessary to prepare bills for construction charges about March 1, 1907.

Canceled water-right constracts, act of March 1, 1907 (34 Stat. 1024) and April 4, 1910 (36 Stat. 374).—These statutes, in authorizing the construction of the Fort Hall project, provide that the Secretary of the Interior "shall sell water rights at not to exceed" $6 per acre, which was payable in five annual installments beginning December 1, 1920. Under the regulations prescribed by the Secretary, "failure to make any two payments shall work a forfeiture of the rights acquired by the purchaser." This provision is specific, and forfeiture automatically takes place in cases of delinquency. The water rights on 8 tracts, with a combined area of approximately 239 acres, were canceled in accordance with the above departmental regulations. Collections for water-right charges under the act of March 1, 1907, were made by the United States Land Offices at Blackfoot. In letter of April 19, 1926, Commissioner of the General Land Office to the register of the Blackfoot land office, approved by E. C. Finney, First Assistant Secretary, it was stated that the owners of lands upon which water rights had been canceled, could reinstate their water rights by making new applications. "New applicants for water rights will be required to sign agreements, pay United States Land Office $18.12 per acre, and to the Indian Office $15.10 per acre for each irrigable acre in the tract they own." The landowners of these tracts attempted to reinstate water rights, but stated that the local land office did not have any instructions or were not in a position to execute new contracts, and also the supervising engineer's office had not been definitely advised in detail regarding this matter, particularly with regard to the contract form to be used. Several of the landowners have addressed communications to the department in an endeavor to reinstate these contracts, but so far no definite action has been taken by the Indian Office.

Conflicting contracts.—In checking up the areas under water-right contracts, it was discovered that there were several tracts of land which were susceptible of irrigation by reason of the construction, enlargement, and rehabilitation of the irrigation system, portions of which had secured water-right contracts under the acts of March 1, 1907, and April 4, 1910. In an endeavor to comply with Indian Office instructions regarding the necessity of executing agreements with all landowners in accordance with the provisions of the act of May 24, 1922, the entire area of some of these tracts were included in the foregoing supplemental construction contract. The question arises whether these tracts of land will be permitted to secure a complete water right by extending the area included in the original water-right contract under the act of March 1, 1907, and securing this right by paying $6 per acre upon the additional area not included in that contract, or whether it will be necessary for these landowners to execute new contracts requiring the payment of the total actual water-right construction costs for the lands not included under the original contracts regardless of the fact that the supplemental construction contract of May 24, 1922, covers the entire area susceptible of irrigation by reason of reconstruction or enlargement work. Detailed reports covering these cases have been prepared and submitted to the Indian Office for appropriate action. No definite instructions regarding the handling of water-right contracts for the particular lands in this status have yet been received. This matter should also be settled prior to March 1, 1928, so that the proper bills for construction charges, which are due and payable on April 1, 1928, may be prepared at this time.

Fort Hall project operations in the Blackfoot River.—The major portion of the water supply for the Fort Hall project consists of flood water that is impounded in the Blackfoot Reservoir and Gray's Lake, from which it is released as required, and conveyed down the channel of the Blackfoot River. The project's Snake River water supply is also carried in the Blackfoot River channel for a distance of approximately 7 miles, coming into the river about 7 miles above the project Main Canal diversion dam. The Idaho or reservation canal also provides carry-

ing capacity for the Sand Creek waste waters which are taken into the canal about 3¼ miles above its confluence with the Blackfoot River. This carrying capacity was provided by agreements executed by the United States in 1924 with the several irrigation districts and canal companies contributing to the inflow of Sand Creek, when this canal was enlarged under the supplemental construction work, provided by the act of May 24, 1922. Now, as well as for many years prior to the construction of the Fort Hall project, the owners of the land lying north of the river have irrigated their land from the river, in which they have a decreed right in the normal flow. Ever since the operation of the Fort Hall project was begun, there has been more or less complaint on the part of some of these landowners relative to the flooding and seepage of their lands, the injury or destruction of their diversion weirs, head gates, canals, and various other matters.

The capacity of the Blackfoot River channel is not sufficient for carrying the stored waters from the Blackfoot Reservoir in the quantity required for the Fort Hall project in addition to the water to which the people on the north side of the river are entitled. In addition to this, an occasional large quantity of water, frequently as much as 400 to 600 second-feet, is thrown into the river from Sand Creek. Furthermore, when it is considered that the river, with only half the irrigable area of the Fort Hall project in cultivation, and drawing water, overflows its banks and submerges adjacent lands for several weeks during the irrigation season, it is readily apparent that much more damage will result in the future when the area under irrigation on the project is increased, with the resultant necessity of an increased flow in the Blackfoot River.

It was found on beginning the reconstruction work provided by the act of May 24, 1922, that these people had been promised various forms of relief by former local officials of the Indian Service, and in consequence there was an insistent demand on their part that something be done to relieve the unsatisfactory conditions on the Blackfoot River. The estimates for enlargement and reconstruction work did not provide for the improvement of the Blackfoot River Channel; and consequently no funds were available under the appropriation act of May 24, 1922, for this work. However, funds were provided in 1927 for a complete investigation and water-right survey of the Blackfoot River, with particular reference to the investigation of any alleged damages that may have resulted from Government operations. This work is still being carried on, and it is planned to complete a detailed report on this matter near the close of the present fiscal year.

It will be necessary to do considerable enlargement and improvement work to the Blackfoot River channel from the point where the Idaho Canal empties into the Blackfoot River, to the Fort Ball project Main Canal diversion dam, a distance of approximately 7 miles. A tentative plan for this improvement work includes the construction of an equalizing or regulating reservoir of approximately 6,000 acre-feet capacity, which would result in considerable conservation of Blackfoot River water and make possible the utilization of the return and waste inflows to the Blackfoot River, such as Sand Creek. Under the present conditions, where the stored water released from the Blackfoot Reservoir flows in the Blackfoot River, a distance of approximately 58 miles, to the Fort Hall Main Canal diversion dam, it is impossible to secure close regulation of stored water released and utilize the fluctuating inflows to the Blackfoot River. In connection with the Blackfoot River improvement work some drainage work is contemplated to relieve the seeped and water-logged condition of the bordering lowlands, for which condition Blackfoot River may be partly responsible. The detailed estimates in connection with these investigations have not yet been made, but it is roughly estimated that the construction work involved in the improvement of the Blackfoot River and Gray's Lake water supply features will cost approximately $125,000.

Gray's Lake auxiliary reservoir and damage claims of William Larkins and Wright brothers on Meadow Creek.—While construction work, as provided by the act of May 24, 1922, was in progress, it was found that it would be necessary to do more work in connection with the rehabilitation and reconstruction of the Blackfoot Dam than was contemplated by the board of engineers, and that their estimates did not adequately provide for the complete development of the ultimate storage possibilities in Gray's Lake. As this storage capacity was not immediately necessary for the irrigation of the present area in cultivation, it was considered advisable to do only sufficient work and to make the necessary expenditure that might be required under the State laws to protect the rights of the United States in this lake. Under the present conditions, an annual storage of approximately

20,000 acre-feet can be derived from Gray's Lake, and with the enlargement of the Meadow and Sheep Creek channels and the construction of a permanent control gate at Clerk's Cut, it is probable that approximately 30,000 acre-feet of water can be conserved annually. The ultimate storage possibilities of Gray's Lake are from 40,000 to 60,000 acre-feet annually, but before this amount can be stored, it will be necessary to construct a levee at the north end of the lake to prevent the inundation of privately owned marginal lands, or the outright purchase of these lands to be included in the reservoir right of way.

Water stored in Gray's Lake is conveyed to the Blackfoot Reservoir through an artificial channel known as "Cla-k's Cut," which discharges into Sheep Creek, a tributary of Meadow Creek, which flows into the Blackfoot Reservoir.

It is apparent that the landowners on Meadow Creek, and also the marginal landowners on Gray's Lake, are inconvenienced by Government operations, and that if these are to be continued, the development of this auxiliary storage reservoir should be completed. It is roughly estimated that it will require approximately $25,000 to complete the construction work required. Detailed estimates and recommendations for this work are also being prepared in connection with the Blackfoot River report previously mentioned.

Project high lands under water-right contracts.—Water-right agreements executed with private landowners, under the provisions of the acts of March 1, 1907 (34 Stat. 1024), and April 4, 1910 (36 Stat. 274), (original contracts selling water-rights to private landowners of the ceded tract for $6 per acre) in many cases included large tracts of land lying above the irrigation laterals of the project, and to which water could not be delivered by gravity flow. In some instances the landowners installed pumping equipment for the irrigation of these areas and annually paid the regular project operation and maintenance charges. After reconstruction and enlargement work was undertaken, these landowners requested the Government to construct and provide facilities for the irrigation of these areas, contending that they signed the agreements required under the act of May 24, 1922, providing for the repayment of supplemental construction, as the result of certain promises and statements alleged to have been made by former officials of the project to the effect that the supplemental construction work would include the construction of adequate irrigation facilities for these lands. It was held by the Indian Office that the supplemental or reconstruction program did not include this work. Moreover it was not contemplated, nor provided for in the report of the Board of Engineers on which the appropriations are based. Considerable controversy over this matter arose, involving several petitions from the landowners, many reports and much correspondence between local officials and the Indian Office. Finally in March, 1927, after sending representatives to Washington the landowners of the so-called "Williamson Hill tract," involving 15 tracts of land, or a total area of 408 acres, were successful in securing a change in the announced policy of the Indian Office and the Commissioner of Indian Affairs directed the construction of a siphon or pipe line from the main canal, at a cost of approximately $22,000 for the irrigation of this area. Until the reconstruction of the Fort Hall main canal on a higher elevation, which was not contemplated in the plans of the Board of Engineers, it was not possible to provide water for this area by gravity.

As a result of the construction by the Government of the Williamson Hill pipe line, the landowners of other high-land areas are demanding that these areas be provided with irrigation facilities.

The lands in these areas, in so far as existing contracts are concerned, have in the judgment of the advisors, a far more valid claim upon the Government than the Williamson Hill landowners, and in order that there may be no discrimination, it is believed their demand should be complied with.

It is the judgment of the advisers, after an examination of the contracts pertaining to water-rights, and an investigation of field conditions, that the expenditure to build the Williamson Hill pipe line was a misapplication of funds for work never contemplated by Congress in making appropriations for this work. It would have been far better in our opinion to have expended this money in completing the work essential for the welfare of the entire project as on the Gray's Lake development, rather than for the benefit of a few people primarily interested not in farming, but in developing and selling townsite-subdivisions.

Practically all of the controversies and questions relative to the obligation of the United States to deliver water to these isolated high areas of lands on the Fort Hall project, are due to the fact that no irrigable area surveys were made during the construction work under the act of March 1, 1907, and that the land descriptions of areas covered by the water right agreements executed in accordance with

the provisions of the act of March 1, 1907, and April 4, 1910, were in most cases, the legal subdivisions or gross area descriptions.

Sand Creek.—The Sand Creek case and the Blackfoot River water-right controversy may be mentioned as the two long-outstanding controversies between the officials of the Fort Hall project and outside interests. The Sand Creek troubles were acquired with the purchase of the Idaho Canal, and involved the dumping of waste waters into this canal, accumulating in Sand Creek, from an extensive irrigated area included in several irrigation districts and canal company segregations above the Idaho or Government Canal. Originally the Government Canal did not have sufficient capacity to adequately carry this water to the Blackfoot River, and it has always been a source of annoyance and expense, particularly during the winter months, and several times during the period from 1912 to 1924, reached the point where litigation and court action was contemplated. Under the supplemental construction program provided by the act of May 24, 1922, carrying capacity for Sand Creek waters to the Blackfoot River was provided for by agreements executed with the Idaho Irrigation District, Progressive Irrigation District, Snake River Valley Irrigation District, the Eastern Idaho Water Co., and the East Branch Blackfoot Canal Co. These contracts provided for the payment of approximately $10,000 and a proportionate share of future maintenance expense. After the contracts were executed, the contracting parties attempted to repudiate the contracts on the grounds that the Government derived considerable benefit from the inflow of waters. The contracts, however, were approved by the Secretary of the Interior in April, 1926, and the United States Attorney instructed to enforce collection. Payments under these contracts were completed August, 1927. If the foregoing interests had been required to construct their own waste channel to the Blackfoot River, it would have required an expenditure of approximately $50,000 and considerable economy resulted in the provision for carrying capacity in the Idaho or Government Canal.

Blackfoot River water rights.—The Blackfoot River water-right controversy began almost as soon as irrigation on the Fort Hall project, and was due principally to the fact that a number of water rights, including those of the Government, were not well defined or a matter of record in the State engineer's office. A portion of the water rights was adjudicated by a court decree issued August 1, 1891, in the case entitled "Stevens *v.* Eastern Idaho Water Co. et al."

After the beginning of irrigation operations on the Fort Hall project, a number of the canal companies and water users diverting from the north side of the Blackfoot River, claimed certain "users' rights" (which were not on record), in addition to the rights granted by the court decree in the Stevens case. The Government, on the other hand, contended that all surplus waters above the amounts thus decreed belonged to the United States. During the past 12 or 15 years several attempts have been made to amicably settle the disputes involved, but no satisfactory settlement has been reached. The State commissioner of reclamation was also called upon and an attempt made to settle the controversies involved by the operation of the river for several seasons under the supervision of a deputy water commissioner. The private canal companies have been charged with diverting stored waters belonging to the United States, and it has been contended, on the other hand, that the United States diverted natural stream flow belonging to the canal companies and private water interests. The early policies of the Government indicated that it was the intention in the construction of the Fort Hall project to acquire water rights in accordance with State laws, and that the principle involved in the Winters decision could not be enforced in securing water rights for the Fort Hall project.

The Government has not fully complied with the State laws in carrying out the completion of proof required for the diversion of waters of public streams in accordance with the State laws, this being due principally to the fact that local officials have been informed that it was not necessary to comply with the State laws and regulations in this regard, that the waters of all streams were the property of the United States, and that it was not necessary to fully comply with State statutes in these matters, but only as a matter of courtesy and notification to the public that such waters were claimed by the Government. It is believed that no satisfactory settlement of this matter can be accomplished until all water rights on the Blackfoot River have been adjudicated by the Federal court and the rights defined by a court decree. The private individuals and canal companies interested also feel that adjudication of water rights is necessary and welcome the early institution of a suit to quiet title in and to the waters of the Blackfoot River. This matter has been taken up with the Department of Justice, and preparations are being made to institute a suit at an early date. The offi-

cials of the Fort Hall project and other water users are in accord regarding certain water-right matters, and it is believed that nearly all the questions involved can be settled by stipulation and the stipulations embodied in a court decree.

Lease of irrigable lands.—Because of the fact that the act of March 1, 1907, provides that the Indians and Indian lands leased for a period of three years or less shall be free from operation and maintenance charges, it is necessary for Congress to annually appropriate funds for operation and maintenance costs, properly assessable to these lands. During the past few years the appropriations for this purpose have been reduced by Congress below the estimated requirements made by the local project management, and the appropriation per acre has been considerably less than that assessed against homestead, non-Indian-owned, and leased lands.

The water-supply and canal features of this project are so extensive that operation and maintenance costs can not be materially reduced. In view of the fact that it is expected that as much of this cost as possible should be collected from the lands cultivated, it is necessary to promulgate more favorable leasing terms, and an increased effort should be made to secure lessees for all of the uncultivated Indian lands. Lessees will add from $20 to $50 per acre valuation to the land by leveling, fencing, and cultivation, and the Government will be able to increase the revenues to be derived from the assessment of operation and maintenance charges. Many prospective lessees state that Indian agency officials can give them no definite information relative to leasing and that they appear to be indifferent to many tentative proposals advanced. Others state that the lease period is too short to justify the leasing of unimproved lands. This may be due in some instances to a reluctance on the part of the Indian owner to consent to a long-term lease at a low rental. The Indian very frequently desires to have the lessee do all the laborious work involved in land leveling and improvement and then expects the land to be returned to him as soon as this is done. The greater part of the rough and rolling irrigable lands are in tribal ownership and exceptionally favorable terms should be made to induce lessees to cultivate these lands under improvement leases, with no charges except the irrigation construction and maintenance assessments. Here as on many other reservations the principal obstacle to leasing Indian land is the fact that the Indian demands an excessive cash rental and refuses to sign a lease otherwise.

Lease of nonreservation lands.—A considerable area of public land has been withdrawn for the Blackfoot and Grays Lake Reservoirs, entirely outside of the reservation boundaries and some distance from it. During the low-water stages of the reservoirs, these withdrawn lands are excellently suitable for grazing and some of the lands yield considerable wild or meadow-grass hay. Inasmuch as the project was constructed for the benefit of both the Indians and homestead lands, the miscellaneous revenues to be derived from leases, grazing permits, and rentals should go to the irrigation-project funds and appear as credits under irrigation collections and not to the tribal funds, as has been the case in the past.

Evasion of irrigation charges and taxes by purchasers of Indian lands.—Many Indians owning lands under the project irrigation system have secured "certificates of competency," which entitle them to patent in fee simple to their lands. Most of these lands have been acquired by non-Indians, by direct purchase or by mortgage foreclosures on loans to the Indians. No record is made in the local county offices of change of title, and the new landowner evades irrigation charges until such time as he desires to cultivate the land and request irrigation service. The purchasers of Indian lands are also free from taxes and do not contribute to public activities or support public institutions, from which they benefit. Legislation should be effected that will provide for public record of change of title of Indian lands with patent in fee simple, and subject these lands to local taxation when the title passes from the Indian owner.

Irrigation on Klamath Reservation, Oreg.

1. RECOMMENDATIONS

The present net investment of $42 per acre in the Modoc Point unit is more than the land is worth. The Government is not justified under the circumstances in collecting the cost of the irrigation works from other assets of the Indians. Neither is the Government justified in operating the project at a loss.

It is therefore recommended:

1. That no Government appropriations be made for further operation and maintenance of this unit after the calendar year 1929, but to be operated as at present up to that time.

2. That the Indian Bureau work out some plan with the Indians and whites under the unit to finance the operation and maintenance after that date.
3. That failing to accomplish the above, the operation of the unit shall be shut down.
4. That all construction and accrued charges be suspended for a period of 20 years.
5. That the Indian lands should be pooled and leased in large tracts, on long term leases to stock men for pasture uses.
6. That the Sand Creek unit be turned over to the landowners under the unit for operating under the supervision of the agency, beginning with the year 1930.
7. That the present construction collections of 35 cents per acre per year be considered reasonable, and that collections from both Indians and whites be made at this rate until the construction costs are liquidated.
8. That all construction expenditures on other units be suspended until economic conditions materially change for the better.
9. That the Spring Creek, Fort Creek, and agency units be turned over to the agency for operation to the extent that may be possible with the contributed help of those interested.

2. SYNOPSIS

The Klamath Reservation was established by the treaty consummated between the Modoc, Klamath, and Yahooskin Bands of Snake Indians, in 1864, but the Indians were not finally located on the reservation until 1873. The reservation contained approximately 1,100,000 acres of land, the greater portion of which is rocky and heavily wooded. The elevation of the only agricultural land is over 4,000 feet, and is subject to frosts practically every month in the year. This limits agricultural possibilities to a very considerable degree. The marsh lands, however, are excellent for grazing, and produce excellent returns under proper management. A considerable amount of the land is leased to whites for cattle raising along the streams, and the Indian has done very little in the way of irrigating for several years. A considerable portion of the land has been sold to whites, who are improving the country and using the water to the exclusion of the Indians.

The reservation is situated in Klamath County, Oreg., townships 29 to 37 south, ranges 7 to 13 east. The Southern Pacific Railroad skirts the western boundary of the reservation from north to south. There are two highways on the reservation, Crater Lake, and The Dalles-California; and Chiloquin and Klamath Falls are the principal towns. Markets are local and Pacific coast.

Reservation lands and allotments.—The reservation comprises 305,285 acres grazing land and 800,000 acres of timber land, the latter valued at $31,571,136. Allotments were begun in 1894 and completed in 1910. One thousand five hundred and sixty-seven allotments, averaging 80 acres, were made to all Indians enrolled at Klamath agency, regardless of age; 985 allotments, totaling 149,689 acres, are held under trust patent; 273 allotments, containing 40,905 acres, are held under fee patent; and 44 allotments containing 6,785 acres are no longer under Government control through deceased fee allotments.

Population and health conditions.—There are 1,268 Indians of the Klamath, Modoc, and Yahooskin Tribes on this reservation, 611 of whom are full bloods and 657 mixed bloods. In 1927 there were 56 Indian births and 37 deaths. All the Indians live in permanent homes, and no rations are issued. It is reported that there are 38 cases of tuberculosis and 61 cases of trachoma.

Climate.—The elevation ranges from 4,100 to 5,000 feet. Maximum temperature, 95°; minimum, 20° below zero. Average precipitation, 21 inches; rainfall, 14 inches; snowfall, 60 inches. Average date of last killing frost, June 1; average date of first killing frost, August 1; growing season 120 days. Killing frosts may occur any month during the year.

Topography, soil, and drainage.—Topographic map was made of Modoc Point project in 1913–14 by the United States Indian Irrigation Service, none being made on any of the other projects. However, boundaries have been run on most of them. The average slope of the irrgiable area is as follows: Modoc point, 6 feet to the mile; Sand Creek, 3 feet to the mile; Klamath Marsh, 3 feet to the mile; Yainax, 10 feet to the mile. Approximately 80 per cent of the irrigable land on the reservation is uniform as to slope. The average cost of clearing, plowing, leveling, and ditching on the irrigable area is $25 per acre.

No soil survey has been made. Soil on the Sand Creek project is volcanic ash underlaid with chalk rock, and on the Modoc Point project is volcanic ash with some alluvial deposit on about 80 per cent, 20 per cent being covered with

cut over timber with soil conditions almost the same as rest of the project. On the Modoc Point project practically all the area affected by alkali was excluded; all the drainage on this project was constructed to keep the lands from becoming waterlogged. None of the lands on any of the Klamath projects are affected by alkali or seepage.

Wild flooding is used for irrigating pasture lands, the furrow method being used for only a few acres; continuous flow method of delivery is employed. There is no specific duty of water, same being supplied on demand; the principal crops are hay and pasture on the Sand Creek Project, and pasture and small garden plots on Modoc Point.

Water supply and water rights.—The water supply for the Klamath Reservation is all from reservation streams with the exception of the headwaters of the Sprague River and part of the Sycan River. Filings have been made to advise the public of the contemplated use of water by Indians. Modoc Point project is watered from the Sprague River, same being sufficient for the needs of this project. Water supply for Sand Creek project is derived from Sand and Scott Creeks. Other units are supplied from miscellaneous small streams on the reservation.

General plan of irrigation development.—Irrigation development on the Klamath Reservation began with the construction of small ditches from Fort Creek in 1902 and 1903, under the supervision of the superintendent of the reservation with some aid from the irrigation engineers. Water was used mostly for pasture and very little land was cultivated. The Modoc Point project was started in 1912, and consisted of a proposed area of about 8,000 acres for which water was diverted from the Williamson River. Canals as constructed cover only 6,000 acres; laterals, head gates, and farm takeouts were constructed, but owing to lack of interest of the Indians in irrigation, the project has never been complete, since the additional 2,000 acres would necessitate the construction of a siphon over the Williamson River.

Sand Creek project was completed in 1920, a temporary diversion dam being constructed across San Creek, and the head gate diverting water into the canal which was constructed across Scott Creek; the water of this creek was diverted into the canal for the irrigation of 3,600 acres in the project.

The divisions of the project, their acreage and present stage of completion, are as follows:

Modoc Point project, 6,000 acres. Completed.
West extension, 2,400 acres. Proposed.
San Creek, 3,600 acres. Completed.
Fort Creek and agency, 7,000 acres. Partly completed.
Klamath Marsh, 80,000 acres. Proposed.
Yainax, 31,000 acres. Proposed.
Spring Creek, 1,000 acres. Completed.

Total costs to date are: Modoc Point, $194,137.68; Sand Creek, $25,856.55; and Klamath general, $57,758.15. It is estimated that $40,000 will be required to complete the Modoc Point project.

Summary of project work.—There is no storage on the Klamath Reservation, although storage is contemplated in the proposed Yainax project. There are 66 miles of canals—10 miles with a capacity of 100 to 250 second-feet, 5 miles with a capacity of 50 to 100 second-feet, 21 miles with a capacity of 15 to 50 second-feet, and 30 miles with a capacity of less than 15 second-feet. There are two diversion dams, one on the Sprague River and one on Fort Creek; 4.8 miles of drains, capacity 15 to 50 second-feet; and 8 individual Indian ditches.

Area and utilization of irrigable lands.—The estimated acreage of arable land that will be irrigable if and when the project is completed is 9,631; acreage irrigable, that is, provided with irrigation facilities, is 9,631, of which 1,976 acres are irrigated. Three hundred and sixty-eight acres were cultivated in 1926, all on the Modoc Point project.

The acreage of Indian-owned land not leased, under canal, is 6,231, of which the Indians irrigated only 80 acres, all on the Modoc Point project. Out of an irrigable acreage of 3,400 owned by whites, only 1,880 acres were irrigated by them.

Principal crops, crop yields, and returns.—On 358 acres cultivated on the Modoc Point project in 1926 the principal crops were 73 acres of alfalfa, total value $1,825; 91 acres of oats, total value $2,275; 25 acres of potatoes, total value $2,000; 14 acres of wheat, total value $420; 12 acres of hay, total value $240; and 129 acres of pasture, total value $1,290.

The Sand Creek project is used mostly for pasture, except $12,000 worth of wild hay sold by white owners.

Economic conditions among project farmers.—The Indians make very little use of the irrigation facilities, which may possibly be due to the fact that their annual payments average from $500 to $700 per capita. However, out of an irrigated acreage of 358 on the Modoc Point project white owners irrigated 162 acres and lessees 116, the Indians irrigating only 80 acres. The per acre construction assessment against Indians is $1.50 on the Modoc Point project and 35 cents on the Sand Creek project; operation and maintenance assessments against Indians are $1 on Modoc Point and 50 cents on Sand Creek.

Project operation and maintenance.—Organization consists of one supervisor of ditches in charge of all work on the Klamath Reservation, and labor as required. Annual expense is about $6,000.

Construction costs and collections.—Total construction costs to June 30, 1927, are $194,137.68 for Modoc Point, $25,856.55 for Sand Creek, and $57,758 for miscellaneous projects on the reservation. Total assessments are $36,781.63 for Modoc Point and $5,432 for Sand Creek. Total construction collections to June 30, 1927, are $1,649.50 for Modoc Point, of which $1,270.75 are from Indians, $313.65 from whites, and $65 from lessees, and $4,507.70 for Sand Creek, all of which is from white owners. Total construction delinquencies amount to $35,132.15 for Modoc Point and $924.30 for Sand Creek.

Operation and maintenance costs and collections.—Total operation and maintenance costs to June 30, 1927, are $62,757.91 for Modoc Point, $3,240.09 for Sand Creek, and $3,251.09 for miscellaneous projects. Operation and maintenance collections amount to $715 for Modoc Point and $5,971.56 for Sand Creek; delinquencies amount to $11,963.40 for Modoc Point and $1,706 for Sand Creek. Assessments on all lands regardless of ownership on both projects were $1 per acre for 1925 and 50 cents per acre for 1926.

3. DIGEST OF TREATIES, EXECUTIVE ORDERS, AND LEGISLATION

Laws.—Act June 21, 1906 (34 Stat., 367) (Klamath agreement).

ART. III. It is agreed that of the amount to be paid to the said Klamath and other Indians, as stipulated in Article II of this agreement, the sum of $25,000 shall be paid in cash pro rata, share and share alike, to each man, woman, and child belonging to said Klamath and other tribes under the jurisdiction of the Klamath Indian Agency, within 150 days from and after the date of the ratification of this agreement, and the sum of $350,000 shall be deposited in the Treasury of the United States to the credit of said Indians, and shall draw interest at the rate of 5 per cent per annum, which interest shall be paid to said Indians annually per capita in cash, and that the remainder of said sum of $537,007.20, after the payment of the legal fees of attorneys having duly approved contracts, shall be expended for the benefit of said Indians, under the direction of the Secretary of the Interior, upon requisition of the Indians through the United States Indian agent, in the drainage and irrigation of their lands, and the purchase of stock cattle for issue to said Indians, and for such other purposes as may in his opinion best promote their welfare: *Provided*, That beneficiaries whose allotments will not be benefited by the irrigation systems constructed under this provision shall not bear any of the expense of such irrigation construction, and shall, as nearly as practicable, receive an equivalent in value of the stock cattle or other articles herein contemplated, that such beneficiary may thus receive his or her proportionate share of the benefits of this provision. * * *

Sec. 5: * * * For the purpose of carrying into effect the foregoing agreement the sum of $537,007.20 is hereby appropriated out of any money in the Treasury not otherwise appropriated, and the siad agreement is hereby ratified and confirmed. Of the said sum so appropriated, $350,000 shall be deposited in the Treasury of the United States to the credit of said Indians and the remainder shall be expended as provided in the third article of said agreement.

Act March 3, 1911 (36 Stat., 1071): For continuing the construction of the Modoc Point irrigation project, including drainage and canal systems, within the Klamath Indian Reservation, in the State of Oregon, in accordance with the plans and specifications submitted by the chief engineer in the Indian Service and approved by the Commissioner of Indian Affairs and the Secretary of the Interior in conformity with a provision in section 1 of the Indian appropriation act for the fiscal year 1911, $50,000: *Provided*, That the total cost of this project shall not exceed $155,000, including the sum of $35,141.59 expended on this project to June 30, 1910, and that the entire cost of the project shall be repaid into the

Treasury of the United States from the proceeds from the sale of timber or lands on the Klamath Indian Reservation.

Act of August 24, 1912 (37 Stat. 534): For continuing the construction of the Modoc Point irrigation project, including drainage and canal systems within the Klamath Indian Reservation, in the State of Oregon, in accordance with the plans and specifications submitted by the chief engineer in the Indian Service and approved by the Commissioner of Indian Affairs and the Secretary of the Interior in conformity with a provision in section 1 of the Indian appropriation act for the fiscal year 1911, $50,000, appropriated in the act of March 3, 1911, is hereby reappropriated: *Provided*, That the total cost of this project shall not exceed $155,000, excluding the sum of $35,141.59 expended on this reservation to June 30, 1910, and that the entire cost of the project shall be repaid into the Treasury of the United States from the proceeds from the sale of timber or lands on the Klamath Indian Reservation.

Act of June 30, 1913 (38 Stat. 98): For completion of the construction of the Modoc Point irrigation project, including drainage and canal systems within the Klamath Indian Reservation, in the State of Oregon, in accordance with the plans and specifications submitted by the chief engineer in the Indian Service and approved by the Commissioner of Indian Affairs and the Secretary of the Interior in conformity with a provision in section 1 of the Indian appropriation act for the fiscal year 1911, $105,000 to remain available until expended.

Act of August 1, 1914 (38 Stat. 602): For maintenance and operation of the Modoc Point irrigation system within the Klamath Indian Reservation, in the State of Oregon, $4,740, reimbursable in accordance with the provisions of the act of March 3, 1911.

Joint resolution March 4, 1915 (36 Stat. 1228): Reenacted the last foregoing item for the fiscal year 1916.

Act May 18, 1916 (39 Stat. 150): For construction, maintenance, and operation of the Modoc Point irrigation system within the Klamath Indian Reservation, in the State of Oregon, $20,000, reimbursable in accordance with the provisions of the act of March 3, 1911: *Provided*, That the limit of cost of said project fixed by the act of August 24, 1912, is hereby changed from $155,000 to $160,000.

Act March 2, 1917 (39 Stat. 986): For maintenance and operation of the Modoc Point irrigation system within the Klamath Indian Reservation, in the State of Oregon, $4,000, reimbursable in accordance with the provisions of the act of March 3, 1911.

Act May 25, 1918 (40 Stat. L., 564): For maintenance and operation of the Modoc Point irrigation system within the Klamath Indian Reservation, in the State of Oregon, $4,000, reimbursable in accordance with the provisions of the act of March 3, 1911, and for completing construction of the Modoc Point irrigation system within the Klamath Indian Reservation, in the State of Oregon, $3,000, to be immediately available and to remain available until expended, reimbursable in accordance with the provisions of the act of March 3, 1911: *Provided*, That the limit of cost of said project fixed by the act of May 18, 1916, is hereby changed from $170,000 to $172,000; in all, $2,000.

Act June 30, 1919 (41 Stat. 25): For maintenance and operation of the Modoc Point irrigation system within the Klamath Indian Reservation, in the State of Oregon, $5,000, reimbursable in accordance with the provisions of the act of March 3, 1911.

Act June 30, 1919 (41 Stat. 3): For the construction, repair, and maintenance of irrigation systems, and for purchase or rental of irrigation tools and appliances, water rights, ditches, and lands necessary for irrigation purposes for Indian reservations and allotments, for operation of irrigation systems or appurtenances thereto, when no other funds are applicable or available for the purpose; for drainage and protection of irrigable lands from damage by floods or loss of water rights, upon the Indian irrigation projects named below.

Under the foregoing $20,000 was appropriated for irrigation work on the Sand Creek and agency projects, Klamath Reservation, Oreg.

Act February 14, 1920: Sand Creek $6,100; Modoc Point, $4,000.

Act March 3, 1921: Modoc Point, Sand Creek, Fort Creek, Crooked Creek, and miscellaneous projects, $10,000.

Act May 24, 1922: Modoc Point, Sand Creek, Fort Creek, Crooked Creek, and miscellaneous projects, $8,600.

Act January 24, 1923: Modoc Point, Sand Creek, Fort Creek, Crooked Creek, and miscellaneous projects, $9,000.

Act June 5, 1924: Modoc Point, Sand Creek, Fort Creek, Crooked Creek, and miscellaneous projects, $9,000.

Act March 3, 1925.—Modoc Point, Sand Creek, Fort Creek, Crooked Creek, and miscellaneous projects, $8,940.

Act May 10, 1926: Modoc Point, Sand Creek, Fort Creek, Crooked Creek, and miscellaneous projects, $6,000.

Treaties and agreements.—The Klamath Treaty was made October 14, 1864, between the United States and 26 of the chiefs and headmen of the Modocs, Klamath, and Yahooskin Snakes.

In 1872 and 1873 a conflict arose between the Modocs and soldiers of the United States, known as the Modoc war, because the Modocs objected to moving onto the reservation.

The McLaughlin agreement was effected on June 21, 1901, when 621,824 acres of disputed territory on the north and east sides of the reservation were excluded from the boundaries for which the Indians received $537,007.20.

The State of Oregon was granted certain lands for the construction of a military road through the Klamath Reservation by act of Congress approved July 2, 1864.

On February 26, 1920, an agreement dated January 6, 1920, with the California-Oregon Power Co. was approved, which in the main provided for the leasing of certain allotted lands and unallotted lands on the Klamath Reservation, described therein, which lands lie below the contour 4,143.3 and are subject to overflow from the Klamath Lake. This agreement contains specifications and plans relative to the construction of dikes around and near the lake side of the land, and along both sides of the Williamson River, for the purpose of excluding the lake waters from the lands, along with the necessary gates, drains, pumps, etc., as may keep the said lands from being overflowed and for the reclamation thereof.

4. HISTORY

The Klamath Reservation was established by the treaty consummated between the Modoc, Klamath, and Yahooskin Bands of Snake Indians in 1864. While the headmen of the tribes that the military officials had decided should reside on the reservation set aside signed the treaty, a considerable number refused to make the reservation their home. This brought about the Modoc war in 1872, and the Indians were not finally located on the reservation until 1873. The reservation contained approximately 1,100,000 acres of land, the greater portion of which is rocky and heavily wooded. The only agricultural land is that lying along Klamath Lake and Klamath marshes and the upper Williamson River Valley. The elevation of this land is over 4,000 feet and is subject to frosts practically every month in the year. This limits agricultural possibilities to a very considerable degree. The marsh lands are excellent for grazing, and under proper management produce excellent returns from this use.

The Indians at the time the reservation was set aside were strictly nomadic and had been living almost entirely by fishing and hunting. It was evidently the intention at the time the treaty was made to induce the Indians to become an agricultural people, as provision was made for purchase of horses and farming implements. The Indians apparently did not adapt themselves to this sort of work as no particular mention of agriculture is made in the reports of the superintendents until 1898. Very little, if any, irrigation work was done until about 1900, when the Indians with the help of the agency built some ditches from the agency creek. Owing to the fact the Indians had no means of livelihood they were compelled to work for the white people in order to live, and most of the able-bodied men developed into good woodsmen and were able to support their families with but apparently little assistance from the Government. In 1901 and 1902 some work was done on the Modoc Point project, but it was not until 1912 that the project was started under the present plan. The Indians apparently took a great interest in the irrigation development on the Modoc Point project at the time it was started, and did most of the work in the excavation of canals and all of the common labor work. They, however, lost their interest in farming after 1924, when their per capita payments from timber began coming in and also collections for irrigation charges were made from the allottee out of his individual per capita payment.

The construction of the Sand Creek project was undertaken at the insistence of the allottees on the upper Klamath marsh. However, as soon as ditches were constructed, the greater portion of these allottees sold their lands to whites. They obtained a fair price for it in this manner and without irrigation it was

worth very little. The irrigation that has been carried on on the Yainax and upper Williamson and above the Klamath marsh, has been under the general direction of the irrigation service, but the work has been done by lessees and allottees. These developments consist of small ditches and temporary diversion dams, and the water diverted is used in flooding wild hay.

A considerable amount of the land is leased to whites for cattle raising along these streams, and the Indian has done very little in the way of irrigating for several years. A considerable proportion of the allotments under these small projects have been sold to whites who are improving the country and using the water to the exclusion of the Indians.

5. LOCATION, TRANSPORTATION, AND MARKETS

State: Oregon.
County: Klamath.
Townships: 29 to 37 south.
Ranges: 7 to 13 E. W. M.
Railroads: Southern Pacific skirting the western boundary of the reservation from north to south.
Highways: Crater Lake Highway, The Dalles-California.
Cities and towns: Chiloquin, 800; Klamath Falls, 5,000.
Railroad stations: Chiloquin.
Markets: Local and Pacific coast.

6. RESERVATION LANDS AND ALLOTMENTS

Area of reservation originally, 1,106,285 acres.
Area of reservation at present, 1,106,285 acres.

(*a*) *Area, classification and estimated value of individual Indian and tribal lands*

Classification	Acres	Total value
Grazing land	305,285	
Timberlands	800,000	$31,571,135

(*b*) *Allotments.*—Allotments were begun in 1894, and were completed in 1910. The allotment roll was closed April 15, 1910. One thousand five hundred and sixty-seven allotments, averaging 80 acres, were made to all Indians enrolled at Klamath Agency with the Klamath, Modoc, and Yahooskin Band of Snakes, at the time allotments were made, regardless of age.

Classification:	Total area (acres)
Irrigated agricultural	1,725
Irrigable agricultural	63,955
Dry farming	25,109
Grazing	100,000
Timber	50,135
Total	240,924

Nine hundred and eighty-five allotments, totaling 149,689 acres, are now held under trust patent. Two hundred and seventy-three allotments containing 40,905 acres are now held under fee patent, and 44 allotments containing 6,785 acres, are no longer under Government control, through deceased fee allotments.

Two hundred and one full and 40 fractional allotments, comprising timber, grazing, and agricultural land, were sold at an average price of $10 per acre, or a total of $34,915.20. Five hundred and sixty-three Indians have no allotments, and 440 Indians, of whom 189 are deceased, received fee patents and sold their allotments.

7. Population and Indian health conditions (1,268 Indians—Klamath, Modoc, and Yahooskin Tribe of Snakes)

	1910	1920	1925	1927
Indian births	45	42	44	56
Indian deaths	33	52	28	37
Total population	1,126	1,131	1,244	1,268

Indians having tuberculosis	38
Indians having trachoma	61
Indians living in permanent homes	1,268
Fullblood Indians	611
Less than fullblood	657
Indians receiving rations	None.

8. CLIMATE

Range in elevation of irrigable areas, 4,100 to 5,000 feet.
Maximum temperature, plus 95°.
Minimum temperature, minus 20°.
Average maximum temperature, 58°.
Average minimum temperature, zero.
Average annual precipitation, 21 inches.
Average annual rainfall, 14 inches.
Average annual snowfall, 60 inches.
Average date last killing frost (spring), June 1.
Average date first killing frost (fall), August 1.
Average growing season, 120 days.
Killing frosts may occur any month during the year.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(*a*) *Topography.*—Topographic map of Modoc Point project was made in 1913–14 by United States Indian Irrigation Service, method not known, one foot contours, filed in office of supervising engineer, district No. 1. No topographic maps of the other projects on the Klamath Reservation have been made; however, boundaries have been run on most of them.

Average slope of irrigable area Modoc Point, 6 feet to the mile.
Average slope on Sand Creek project, 3 feet to the mile.
Average slope on Klamath Marsh, 3 feet to the mile.
Average slope on Yainax project, 10 feet to the mile.

Approximately 80 per cent of all the irrigable land on the whole reservation is uniform as to slope, as it is mostly composed of river and marsh bottom lands.

Average lands, cost per acre of clearing, plowing, leveling, and ditching of irrigible area, $6 to $50, average about $25.

(*b*) *Soil.*—No soil survey has been made.

Modoc Point.—Volcanic ash with some alluvial deposit about 80 per cent of area, 20 per cent covered with cut-over timber with soil conditions practical the same as rest of project.

Sand Creek.—Volcanic ash underlaid with chalk rock at depths varying from 2 to 5 feet. This has been marsh land and contains a large percentage of vegetable growth.

On the Modoc Point project practically all of the area affected by alkali was excluded from the project. None of the lands on any of the Klamath projects have become nonproductive through alkali or seepage.

All the drainage on the Modoc Point project was constructed to keep the lands from becoming waterlogged through excessive use of water.

(*c*) *Irrigation methods.*—Modoc Point: Furrow method only a few acres, most of the irrigation being by wild flooding for pasture lands only.

Sand Creek: Nearly the entire area is irrigated by wild flooding.

Continuous flow method of delivery is employed on all irrigated areas.

(*d*) *Duty of water.*—Water is furnished on demand.

Modoc Point project canal figured for one second-foot for 50 acres.

Sand Creek approximate capacity of canal provides for duty of water 1 second-foot for 60 acres.

(*e*) *Principal crops and average crop production.*—Sand Creek: Hay and pasture entire area.

Modoc Point: Pasture and small garden plots. Very little use being made of irrigation on the Modoc Point project.

10. WATER SUPPLY AND WATER RIGHTS

The water supply for the Klamath Reservation is all from reservation streams with the exception of the headwaters of the Sprague River, and part of the Sycan River which is a part of the Sprague River.

Filings have been made so that the public would be advised that the Indian lands contemplated making use of the various streams.

There is sufficient water in the Sprague River for the Modoc Point project. The flow from the 1,550 square mils of watershed ranges from 200 second-feet during extreme low water to a maximum of 4,000 second feet which is sufficient for the 6,000 acres of land in the Modoc Point project now completed.

The water supply for the Sand Creek project is derived from Sand Creek and Scott Creek, both of which formerly spread out and disappeared in the sand. These two streams were tapped above the sinks and are carried several miles and distributed onto 3,600 acres of land. The combined discharge ranges from 50 second-feet down to 10 second-feet during August in years of drouth, and at times is insufficient for little more than stock water. As this project is used mostly to date for hay and pasture they are able to get along.

There is no question as to ownership of these streams.

Fort Creek supplies the Fort Creek or agency project. Its supply comes mostly from springs and therefore is quite uniform, and is several times more than sufficient for the project's needs.

Agency spring supplies 27 second-feet for school and agency purposes and for irrigation of the agency farm.

Crooked Creek supplies 7 second-feet of water for 380 acres of land, which is more than sufficient.

Yainax is as yet undeveloped except the 1,020 acres under the Brown Spring, which supplies from 8 to 12 second-feet. The main Yainax will derive its water supply by storage from the Sycan apd branches, developing power and pumping from the Sprague River on part of the land.

A recapitulation of the water supply for the Yainax project is as follows:

Stream	Natural flow in second-feet	Storage in acre-feet	Area to be watered
			Acres
Five Mile	18	1,200	1,500
Sycan River	20	33,000	17,500
Browns Creek	----------	1,600	800
Whiskey Creek	12	2,000	1,600
Pumping from Sprague	150	----------	9,000
Total	200	37,800	30,400

Williamson River and its branches will supply considerable water for the irrigation of the Klamath Marsh if it should be drained, but not sufficient for all of the land. Big Spring with about 60 second-feet will supply some of the land. It is believed that much of the marsh land could be diked with contour dikes and hold the winter flood waters until late spring for producing wild hay and pasture.

A blanket water filing was made on all reservation streams on October 7, 1918, known as application No. 6299. Individual filings had been previously made on certain streams prior to that time.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

(*a*) *General plan.*—Irrigation development on the Klamath Reservation started with the construction of small ditches from what is known as Fort Creek, in 1901–2. These ditches were constructed under the supervision of the superintendent of the reservation with some aid from the irrigation engineers. The water diverted by these canals was generally used for flooding pasture land, and very little of the area susceptible of irrigation was actually cultivated. The first project to be undertaken by the irrigation branch and the first project on which engineering surveys and studies were made was the Modoc Point project. This project was started in 1912. It consisted of a proposed area of approximately 8,000 acres for which water was diverted from the Williamson River by

concrete diversion dam. The canals as constructed, however, only covered approximately 6,000 acres. The remaining 2,000 acres necessitated the construction of a siphon over the Williamson River. Owing to the lack of interest of the Indians in irrigation, the completion of the project has never been seriously considered. Laterals, headgates, and farm takeouts were constructed, and the system was planned to enable deliveries of water to be made to each allotment.

The Sand Creek project was undertaken in 1919 and finished the next year. A temporary diversion dam was constructed across Sand Creek and the headgate diverting the water into the canal which was constructed across Scott Creek, and the water of this creek was diverted into the canal for irrigation of the 3,600 acres in the project. This land lies almost ideally for irrigation, as the slope is very slight and the land requires but very little leveling to enable it to be completely flooded. Comparatively little work is required to operate the project. The only trouble is that caused by pumice stones floating down the canal and lodging against the headgates.

The other irrigation ditches on the reservation have been constructed by lessees and owners of former Indian allotments, and in but few cases were constructed according to any definite plan. Generally a diversion dam is placed in one of the small streams, and the canal is constructed leading to the land it is desired to flood. Water is turned on to this land until it is sufficiently irrigated, and then the dam is lowered and the water is allowed to pass to the next user.

(b) Divisions or units of project

	Acres
Modoc Point project (completed)	6,000
West Extension (proposed)	2,400
Sand Creek (completed)	3,600
Fort Creek and Agency (partly completed)	7,000
Klamath Marsh (proposed)	80,000
Yainax project (proposed)	31,000
Spring Creek (completed)	1,000

(c) Present condition of project

Unit	Proposed irrigable area	Present irrigable area
Modoc Point	8,031	6,031
Sand Creek	3,614	3,614
Fort Creek	7,000	2,580
Yainax	31,000	1,020
Klamath Marsh	80,000	None.
	129,645	

Costs	Modoc Point	Sand Creek	Klamath general
Cost to date	$194,137.68	$25,856.55	$57,758.15
Per acre cost	$32.34	$7.18	
Estimate to complete	$40,000.00		
Estimated cost per acre complete	$42.00	$7.37	
Per cent completed	80	100	

12. SUMMARY OF PROJECT WORKS

(a) Storage.—There are no storage reservoirs on the Klamath Reservation, although in the proposed Yainax project storage is contemplated.

(b) Canals

Capacity:	Miles
100 to 250 second-feet	10.1
50 to 100 second-feet	4.8
15 to 50 second-feet	21.0
Less than 15 second-feet	30.0

(*c*) *Diversions.*—Diversion dams are now constructed as follows:

On the Sprague River above the junction with the Williamson for diverting waters of the Sprague River into the main canal of the Modoc Point project; it is of concrete. Excavation 1,092 cubic yards at average cost of $2.04; 520 cubic yards of concrete at average cost of $11.86; 300 cubic yards of reinforced concrete, cost $21.44.

On Fort Creek a log crib diversion furnishes water for a portion of the agency project, built at a cost of $750. An earth-fill rock-paved diversion at the agency spring, which also furnishes power for lights and pumping as well as irrigation, was built at a cost of $2,814.91, all out of school funds.

(*d*) *Drains.*—Capacity, 15 to 50 second-feet; 4.8 miles.

(*e*) *Individual Indian ditches.*—Lentz, located in T. 30 S., R. 8 E., 400 acres from Big Springs.

Ball, located in T. 30 S., R. 9 E., 350 acres from Williamson River.

Crawford, located in T. 34 S., R. 8–9 E., 140 acres from Springs.

Skeen, located in T. 35–36, S. R. 9 E., 280 acres from Trout Creek.

Skeen, located in T. 35 S., R. 12 E., 60 acres from Mill Creek.

Chooktoot, located in T. 35 S., R. 12 E., 60 acres from Snake Creek.

Chooktoot, located in T. 36 S., R. 12 E., 400 acres from Whiskey Creek.

Obenchain, located in T. 36 S., R. 13 E., 800 acres from Five Mile Creek.

13. Area and utilization of arable and irrigable lands

	Modoc Point project			Sand Creek project		
	1924	1925	1926	1924	1925	1926
Acreage arable	6,031	6,031	6,031	3,600	3,600	3,600
Owned by Indians	5,031	5,031	5,031	1,200	1,200	1,200
Owned by whites	1,000	1,000	1,000	2,400	2,400	2,400
Acreage irrigable	6,031	6,031	6,031	3,600	3,600	3,600
Owned by Indians	5,031	5,031	5,031	1,200	1,200	1,200
Owned by whites	1,000	1,000	1,000	2,400	2,400	2,400
Acreage irrigated	2,123	2,380	358	1,140	1,060	1,618
By Indians	------	------	80	------	------	------
By lessees	------	------	116	------	------	------
By white owners	------	------	162	------	------	1,618

14. PRINCIPAL CROPS, CROP YIELDS AND RETURNS

(*a*) *Detailed crop data, project lands irrigated, Modoc Point, 1926*

Crop	Acres	Average value per acre	Total value
Alfalfa	73	$25	$1,825
Hay	12	20	240
Garden	2½	50	125
Oats	91	25	2,275
Wheat	14	30	420
Rye	7	20	140
Berries	4½	100	450
Potatoes	25	80	2,000
Pasture	129	10	1,290
	358	40	8,706

Sand Creek, 1926.—No data, as this project is mostly used for pasture, except about $12,000 worth of wild hay sold by white owners.

(*b*) *Crop valuation from project lands not irrigated but dry farmed.*—There is but little dry farming on the entire reservation, most of the marshes and river bottom being cut for wild hay and used for pasture.

15. ECONOMIC CONDITIONS AMONG PROJECT FARMERS

There are 136 allotments under Modoc Point, and about 21 under Sand Creek. Approximately 1,587 Indians receive payments for timber and grazing leases. The annual payments range from $500 to $700 for each Indian.

	Modoc Point	Sand Creek
Per acre construction assessment against Indians	$1.50	$0.35
Per acre operation and maintenance assessment against Indians	1.00	.50

16. PROJECT OPERATION AND MAINTENANCE

(*a*) *Organization.*—One supervisor of ditches, in charge of all work on the Modoc Point, Sand Creek, and miscellaneous projects on the Klamath Reservation; salary $1,860 less $240 for quarters, fuel, and light. Two laborers are used at times during the season in patroling and cleaning ditches on the Modoc Point project.

(*b*) *Annual expense.*—A total of about $6,000 is spent annually on the Modoc Point, Sand Creek, and miscellaneous projects, all of which is for operation and maintenance and betterments. The 1926 expenditure was $5,902.04.

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(*a*) *Construction cost to June 30, 1927*

Miscellaneous projects:	
Reimbursable money expended	$57,758.15
Total construction costs	57,758.15
Sand Creek and Modoc Point:	
Reimbursable money expended	199,038.64
Indian tribal moneys expended (reimbursable)	25,856.55
Total expenditures	224,895.19
Less inventory	4,900.96
Total costs	219,984.23
Construction cost, Modoc Point	194,137.68
Construction cost, Sand Creek	25,856.55

Estimated cost to complete for 6,031 acres on Modoc Point, $35.05.
Sand Creek project is complete, and cost $7.37 per acre.

Value of land on both projects without irrigation	$10.00
Value when irrigated	30.00
Increase	20.00

(*b*) *Collection of construction cost.*—Collections are being made on Modoc Point and Sand Creek under act of February 14, 1920. Collections were started in 1923 and are made from Indians and whites alike.

	Modoc Point	Sand Creek
Total construction assessments	$36,781.63	$5,432.00
Per acre annual construction assessments	1.50	.35
Total construction collections to June 30, 1927	1,649.50	4,507.70
Total construction collections to date:		
From Indians	1,270.85	None.
From white owners	313.65	4,507.70
From lessees	65.00	None.
Total construction delinquencies	35,132.15	924.30

(c) Operation and maintenance cost to June 30, 1927

Miscellaneous projects:	
Reimbursable moneys expended	$3,251.09
Total operation and maintenance costs	3,251.09
Modoc Point and Sand Creek:	
Reimbursable moneys expended	43,880.14
Indian tribal moneys expended (reimbursable)	22,117.86
Total expenditures	65,998.00
Operation and maintenance cost, Modoc Point	62,757.91
Operation and maintenance cost, Sand Creek	3,240.09

(d) Operation and maintenance collections to June 30, 1927

	Modoc Point	Sand Creek
Operation and maintenance collections	$715.00	$5,971.56
Operation and maintenance delinquent	11,963.40	1,706.54

The actual acreage irrigated is used as the basis for operation and maintenance collections. Assessments are made for the irrigation season, which varies according to the costs. Assessments are made and bills sent out so that they are due about April 1, before water is turned into the canals. Enforcement is made by nondelivery of water. There has been no particular method of computing assessments, a flat rate being charged, which seems to be as satisfactory as any on these small areas.

	Modoc Point	Sand Creek
Per acre operation and maintenance assessments on all lands regardless of ownership:		
1925	$1.00	$1.00
1926	.50	.50
Collections, operation and maintenance on:		
Indian lands	293.50	None.
Leased lands	10.00	177.50
White-owned lands	411.50	5,794.06
Delinquent operation and maintenance:		
Indian lands	9,641.40	635.60
Leased lands	745.50	275.00
White lands	1,576.50	795.94

18. PROJECT DEFECTS, PROBLEMS, AND COMPLAINTS

The Klamath project is situated in southern Oregon, on the Klamath Indian Reservation, and consists of an estimated area of 128,000 acres, which is divided into seven different units. Of these, the Modoc Point unit of 6,031 acres, the Sand Creek unit of 3,614 acres, and Spring Creek unit of 1,000 acres, have been constructed, and the Fort Creek and agency units have been partly completed.

The constructed system is now capable of serving 17,600 acres, of which 3,047 acres were being irrigated in 1927. On the Modoc Point unit, upon which the Government has expended $194,137.68, only 248 acres were irrigated in 1927, of which 62 acres were irrigated by Indians. On the Sand Creek unit, 1,674 acres were irrigated in 1927, all by white owners. The major portion of this acreage was in pasture. The total irrigated on all the units was 3,047 acres, of which 687 acres were irrigated by Indians. While 3,047 is the acreage irrigated, a much smaller amount is actually cultivated, as a considerable part of this acreage is in pasture and native hay.

Climatic and agricultural conditions.—The project is located at an elevation of 4,100 to 5,000 feet and is subject to frosts any month of the year. It is stated that the last average killing frost in the spring is June 1 and the first killing frost in the fall is August 1. This leaves 60 days between killing frosts. Under such conditions it can not be expected that a wide diversity of agricultural crops can be grown. In fact, it is not safe to attempt to grow most of the cultivated crops that comprise our farm crops. The native hays and pasture do well, as the late

and early frosts do not injure them. It is a fine summer stock section and is best suited for that purpose.

As a purely farming section, it can not be expected to attract the settler, unless he desires to use it in connection with stock raising, and then due to the limited season, it fits in best where it can be operated in connection with stock interests, that winter at lower elevations.

Irrigation development and progress.—The first work on irrigation on the reservation was the construction of 3 miles of canal by the Indians in 1900, from Crooked Creek. Some construction work was done on the Modoc Point unit from 1901 to 1903, but water was not diverted until 1914. The lateral system was completed in 1918.

The first few years considerable acreage was irrigated, but by 1922, only about half the irrigable acreage was being used, as is shown by the following table:

Acreage irrigated, Modoc Point unit

	1922	1923	1924	1925	1926	1927
Alfalfa	171	176	171	145	73	25
Timothy hay	32	30				10
Clover				10		
Wheat	204	182	7	47	14	8
Barley	123	70	28	6		
Oats	689	256	384	210	91	49
Rye	721	923	670	829	7	100
Native and other hay	147	94	99	40	12	
Pasture	1,062	1,008	689	1,010	129	33
Potatoes	27	7	7	2	25	14
Truck	5	4	4	7	7	9
Total	3,161	2,750	2,059	2,306	358	248
Farmed by Indians		2,035	1,960	1,342	80	62

The above table shows a very rapid decline in the use of the irrigated lands until at the present time it amounts to almost nothing.

The supervising engineer states in his annual report for 1923: "The work done by Indians under this project has been very disappointing. This has probably been due to several reasons. First, the expectation and receipt of some $500 per capita from their timber. Second, they do not want to pay construction or maintenance and operation charges. Third, they do not properly prepare their land for irrigation and do not always plan the crops best suited to the climatic conditions."

In his annual report for 1927, the supervising engineer states: "The Indians on the Modoc Point project are not progressing, as far as irrigation is concerned; in fact, they are going backward * * *. If it were not for the few white owners and renters, I would be tempted to recommend that the head gates be locked for a season or two, which I believe would have an effect on their present attitude."

There is no question as far as the Modoc Point unit is concerned that it has been a failure as far as the Indian making use of it is concerned, and whether the failure is due to any one of the above-named causes or to all of them, is of little consequence, as your advisors are convinced that the only use white men could make of the project is in connection with stock raising, when cattle are shipped in for summer feeding. This means that it must be handled in large areas and under long lease. The Indians can not themselves use their land in this way.

Construction costs and return.—The construction costs and collections on the several units to June 30, 1927, are as follows:

Unit	Construction costs	Collections	Net investment
Modoc Point	$194,137.68	$1,649.50	$192,488.18
Sand Creek	25,857.55	4,507.70	21,349.85
Miscellaneous units	57,758.15		57,758.15
Entire project	277,753.38	6,157.20	271,596.18

The act of March 3, 1911, provided for the cost of the Modoc Point unit to be paid from the sale of timber or lands on the Klamath Indian Reservation. The act would seem from its wording to indicate that the cost of the project was to be considered as a tribal expense, but as the benefits of the work contribute to only a small part of the allotments, it would seem to be only fair to the Indians as a tribe, that only the individual's tribal income should be considered applicable to those having allotments under the irrigation system. This it is understood has been the theory of the bureau. The Indians as a tribe, however, fear that their income from timber will be taken to reimburse the Government for the construction of the irrigation works.

The construction cost on the Modoc Point unit now amounts to more than $32 per acre, and it is extremely doubtful, even under white ownership and the best of conditions, whether improvements are worth what they have cost. There is no doubt under the law that the Government can recover its investment from the sale of timber and land, if not from the tribe as a whole, from the individual Indians whose land is benefited by the irrigation works.

It is claimed that the irrigation works were undertaken with the consent of the Indians, but regardless of their consent or action in the matter, they were dependent upon the representatives of the Government for all information as to cost and feasibility; therefore, your advisers are convinced that the Government accepted the responsibility for the irrigation development, and if it now is a failure it would be unjust to take other assets of the individual Indian to pay for the constructed works.

The Sand Creek unit has cost a little over $7 per acre, an amount that is justified for the irrigation of pasture land. This portion of the Government's investment on this project should be recovered. The balance of the construction expenditures of $57,758.15 is divided among the several remaining units of the project, very little of which can be expected to be returned under the present circumstances, unless the construction work should be completed, and then any expenditure in excess of what irrigation is worth for flooding pasture lands, would not be justified. Under the circumstances and conditions existing on this project, no further construction expenditures are justified.

Operation and maintenance costs and returns.—The following are the total operation and maintenance costs and collections upon the several units of the project to June 30, 1927:

	Operation and maintenance costs	Collections	Net investment
Modoc Point	$62,757.91	$715.00	$62,042.91
Sand Creek	3,240.09	5,971.56	−2,731.47
Miscellaneous units	3,251.09		3,251.09
Entire project	69,249.09	6,686.56	62,562.53

It will be noted from the above that the operation and maintenance on the Modoc Point unit, above the collections, amounts to more than 32 per cent of the construction costs, or the total net investment, including construction, on this unit to June 30, 1927, is over $42 per acre.

On the other hand, the Sand Creek unit has paid on operation and maintenance $2,731.47 more than the cost. The total net investment on this unit is a little less than $5.20 per acre.

The annual operation and maintenance cost on this project is about $6,000, the larger portion of which is on the Modoc Point unit.

Irrigation on Fort Peck Reservation, Mont.

1. CONCLUSIONS AND RECOMMENDATIONS

It is the conclusion of the advisers that the Fort Peck Reservation project presents a hopeless situation because of the inadequacy of the water supply. The streams supplying the various units of the project are small, and occasionally are dry at times during the irrigation season. There are no feasible storage sites. The storage already provided is inadequate, unsafe, and excessive in cost.

Although this project represents an expenditure to June 30, 1927, of $941,029.17, there was irrigated during the season of 1927 only 2,730 acres, and it is complained that the water supply was inadequate even for this small acreage, and the Government is confronted by a claim alleging damage to crops as the result of insufficient water.

For the period 1921 to 1927, inclusive, it cost the Government $91,711.71 to operate and maintain this project, and of this amount only $6,775.85, or about 7 per cent, was repaid by water users.

We are firmly conivnced that there is no hope for the recovery of any part of the Government's investment in this project, and that any further expenditures will simply be adding to the loss that eventually must be sustained.

It is recommended—

1. That the project be abandoned at the earliest opportunity, and that no further Government funds be expended either in construction or operation and maintenance.

2. That whatever adjustments are equitably required by the terms of existing contracts with lessees and purchasers of Indian lands, and with homesteaders, be made.

3. That all construction repayments heretofore collected from individuals be credited to accrued operation and maintenance charges due from such individuals, or in the event no such operation and maintenance charges are due, that amounts collected on construction assessments be refunded.

4. That, if they desire to do so, the farmers on each of the various units be allowed to operate and maintain the units for their own use, and at their own expense.

5. That all equipment and material now carried on the irrigation project inventory, including buildings and telephone line, be turned over to the superintendent of the reservation, for such use as he may have for it.

2. SYNOPSIS

The Fort Peck Indian Reservation, in northeastern Montana, was established by act of Congress of May 1, 1886, ratifying an agreement previously made with the Indians. The reservation is bounded on the east, south, and west, respectively, by Big Muddy Creek, Missouri River, and Porcupine Creek. As established (1886), it was about 80 miles long—east and west—and about 40 miles wide, with an area of 3,272 square miles, or 2,094,000 acres. About 100,000 acres along the Missouri River, in the southern part of the reservation, is level bottom land. Aside from this and a few narrow creek valleys, the land is gently rolling or hilly, and is best suited for grazing, although some of it is being dry farmed with occasional success.

Transportation.—The Great Northern Railway passes through the southern part of the reservation, and Poplar—the seat of the Indian agency and school—Wolf Point, Frazer, and a few other small towns are on the railroad.

Inception of project.—As the result of an agreement made September, 1907, between the Indians and the Bureau of Indian Affairs, the Department of the Interior submitted to the Speaker of the House of Representatives the draft of a bill which resulted in the act of May 30, 1908, providing for the "survey and allotment of lands" on the Fort Peck Reservation, "the sale and disposal of the surplus lands after allotment"; and directing that the reservation lands be examined by the Reclamation Service, and that there be constructed such irrigation projects as were deemed practicable. Two hundred thousand dollars, reimbursable from the proceeds of the sale of reservation lands, was appropriated for the examination and construction.

Examination and construction by the reclamation service.—As provided by law, preliminary examinations were made by the Reclamation Service, and the plan of development as outlined in the report of June 14, 1909, by a board of reclamation engineers, was approved by the Acting Commissioner of Indian Affairs July 12, 1909.

In accordance with an agreement between the Reclamation Service and the Bureau of Indian Affairs, entered into at the instance of the latter, the Reclamation Service assumed charge of the projects for the Blackfeet, Flathead, and Fort Peck Reservations in Montana.

Change in plan.—At the suggestion of Chief Irrigation Engineer W. H. Code, of the Indian Bureau, as explained in his report of October 30, 1909, the plan of the reclamation engineers for the immediate construction of the Missouri River unit of 84,000 acres was deferred, and other smaller units but with a questionable water supply were constructed.

Inspection of work by Indian Bureau officials.—While under construction by the Reclamation Service, the project was inspected in 1914 by a board of engineers and officials of the Indian Bureau, who in general approved the work; and the assistant chief irrigation engineer of the Indian Bureau inspected and reported on the work in 1917, at which time he expressed dissatisfaction at the slow progress, and urged early construction of the Poplar River Reservoir.

By order of the Department of the Interior, the project was transferred to the Indian Bureau March 5, 1924.

On February 1, 1926, in an effort to secure greater economy in operation, the project was transferred from the control of the irrigation division to that of the superintendent of the reservation.

Allotments.—As provided by act of May 30, 1908, allotments of 320 acres of grazing land, 40 acres of irrigable land, and 2½ to 20 acres of timber land were made to each Indian then living.

The surplus lands, about 1,250,000 acres, were opened to settlement in 1913. Much of this was settled and dry farmed for a few years, but most of it has been abandoned. In June, 1927, the land within the limits of the former reservation were classified as follows:

Acreage allotted, trust patent land	1,034,733
Acreage allotted, fee patent land	238,227
Homestead entries	658,064
Surplus or tribal land	163,120
	2,094,144

Climate.—Temperature range, −40° to 100°; precipitation, 13.25 inches annually; growing season, 120 days or less.

Water supply.—Wholly inadequate for the 22,795 acres under canals. For the season of 1927, the supply was insufficient for the 2,730 acres irrigated. Because of the inadequacy of the water supply, the project is practically a total failure. In 1925, 2,104 acres were irrigated, while 2,869 acres under canals were dry farmed. The Missouri River is the only adequate and dependable source of water supply for this reservation.

General plan of project.—This project consists of four widely separated units, the Big Porcupine, with an irrigation system covering 5,395 acres, and a questionable water supply for 500 acres, the Little Porcupine, irrigation system covering 2,412 acres, and an estimated water supply for 1,000 acres; the Poplar River unit, irrigation system covering 10,594 acres, and a questionable water supply for 1,000 acres; and the Big Muddy unit, with an irrigation system covering 4,392 acres, and an estimated water supply for 1,000 acres.

Summary of project works.—There are 171 miles of canals and laterals, 4 diversion dams, and 3 reservoirs with capacity of 3,800, 3,900, and 2,000 acre-feet each. One storage dam is in a precarious condition.

Utilization of land.—Principally because of the inadequacy of the water supply, but little farming has ever been done. During the season 1927, only 2,730 acres were irrigated, which however, is the largest acreage irrigated since the project has been in operation. Of this acreage, 1,378 acres were in wild hay, 448 acres in alfalfa, and 904 acres in cultivated crops, principally wheat. Of the 2,730 acres irrigated, Indian farmers, of whom there were 15, irrigated 284 acres. The fact that the water supply is not dependable makes irrigated farming on this project as much of a gamble as dry farming. Failure to utilize this land is sometimes attributed to indifference and laziness on the part of the Indian. In his behalf, it must be admitted that irrigation farming without a dependable water supply is most discouraging to anyone, white or red.

Crop yields and returns.—On the Fort Belknap Reservation, where conditions are much the same as on the Fort Peck Reservation, the average return from crops grown by Indians in 1926 was $5.66 per acre, and from crops grown by lessees, $10.70.

Construction cost.—To June 30, 1927, the total expenditure for construction was $811,806.32. The construction cost as carried on the books of the Indian Office is the above expenditure less an equipment and material inventory of $7,929.50, or $803,876.82. It is the opinion of the advisors that in most instances these inventories are estimated at several times their actual value.

Collection of construction cost.—The total of assessments on construction charges, or the total amount due June 30, 1927, was $56,760.64. Of this $5,904.98 had been collected, leaving a balance due and unpaid of $50,855.66.

Operation and maintenance cost.—The operation and maintenance cost to June 30, 1927, is given as follows:

Reimbursable funds (appropriations) expended	$131, 354. 81
Collections made and expended	5, 797. 54
Total operation and maintenance cost	137, 152. 35

Collection of operation and maintenance cost.—The total assessment of operation and maintenance charges to June 30, 1927, is given as $14,202.46. Of this amount, $12,196.96 had been collected, leaving a balance due and unpaid of $2,005.50.

3. DIGEST OF LEGISLATION

Act of May 30, 1908 (35 Stat. 558): An act for the survey and allotment of lands now embraced within the limits of the Fort Peck Indian Reservation, in the State of Montana, and the sale and disposal of all the surplus lands after allotment.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior be, and he is hereby, authorized and directed to cause to be surveyed all the lands embraced within the limits of the Fort Peck Indian Reservation, in the State of Montana, and to cause an examination of the lands within such reservation to be made by the Reclamation Service and by experts of the Geological Survey, and if there be found any lands which it may be deemed practicable to bring under an irrigation project, or any lands bearing lignite coal, the Secretary of the Interior is hereby authorized to construct such irrigation projects and reserve such lands as may be irrigable therefrom, or necessary for irrigation works, and also coal lands as may be necessary to the construction and maintenance of any such projects.

SEC. 2. That as soon as all the lands embraced within the said Fort Peck Indian Reservation shall have been surveyed the Commissioner of Indian Affairs shall cause allotments of the same to be made, under the provisions of the allotment laws of the United States, to all Indians belonging and having tribal rights on said reservation; and there shall be allotted to each such Indian three hundred and twenty acres of grazing land, and there shall also be made an additional allotment of not less than two and one-half acres nor more than twenty acres of timber land to heads of families and single adult members of the tribe over eighteen years of age: *Provided,* That should it be determined as feasible, after examination, to irrigate any of said lands, the irrigable land shall be allotted in equal proportions to such only of the members of said tribe as shall be living at the day of the beginning of the work of allotment on said reservation by the special allotting agent, and such allotment of irrigable land shall be in addition to the allotment of grazing and timber lands aforesaid, but no member shall receive more than forty acres of such irrigable land; and to pay the costs of examination provided for herein and for the construction of irrigation systems to irrigate lands which may be found susceptible of irrigation, there is hereby appropriated $200,000, to be immediately available, the said sum and any and all additional sums hereafter appropriated to pay the cost of such examination and irrigation systems to be reimbursed from proceeds from sales of lands within said reservation: *Provided, however,* That any land irrigable by any system constructed under the provisions of this Act may be disposed of, subject to the following conditions: The entryman or owner shall, in addition to the payments required by section 8 of this Act, be required to pay for a water right the proportionate cost of the construction of said system in not more than fifteen annual installments, as fixed by the Secretary of the Interior, with a view to the return of all moneys expended thereon, the same to be paid at the local land office, and the register and receiver shall be allowed the usual commissions on all moneys paid.

The entryman of lands to be irrigated by said system shall, in addition to compliance with the homestead laws, reclaim at least one-half of the total irrigable area of his entry for agricultural purposes, and before receiving patent for the lands covered by his entry, shall pay the charges apportioned against such tract, nor shall any such lands be subject to mineral entry or location. No right to the use of water shall be disposed of for a tract exceeding one hundred and sixty acres to any one person, and the Secretary of the Interior may limit the areas to be entered at not less than forty nor more than one hundred and sixty acres each.

A failure to make any two payments when due shall render the entry and water-right application suvject to cancellation, with the forfeiture of all rights under this Act, as well as of any moneys paid thereon. The funds arising hereunder

shall be paid into the Treasury of the United States and be added to the proceeds derived from the sale of the lands. No right to the use of water for lands in private ownership shall be sold to any landowner unless he be an actual bona fide resident on such land or occupant thereof residing in the neighborhood of such land, and no such right shall permanently attach until all payments therefor are made.

All applicants for water rights under the systems constructed in pursuance of this act shall be required to pay such annual charges for operation and maintenance as shall be fixed by the Secretary of the Interior, and the failure to pay such charges when due shall render the water-right application and the entry subject to cancellation, with the forfeiture of all rights under this act as well as of any moneys already paid thereon.

The Secretary of the Interior is hereby authorized to fix the time for the beginning of such payments and to provide such rules and regulations in regard thereto as he may deem proper. Upon the cancellation of any entry or water-right application, as herein provided, such land or water rights may be disposed of under the terms of this act and at such price and upon such conditions as the Secretary of the Interior may determine, but not less nor more than the cost of originally fixed.

In every case in which a forfeiture is enforced and the land and rights of an entryman are made the subject of resale then, after the payment of the balance due from the entryman and the cost and charges, if any attendant on the forfeiture and resale, any surplus remaining out of the proceeds of such sale shall be refunded to said entryman or his heirs.

The land irrigable under the systems herein provided which has been allotted to Indians in severalty shall be deemed to have a right to so much water as may be required to irrigate such land without cost to the Indians for the construction of such irrigation systems. The purchaser of any Indian allotment purchased prior to the expiration of the trust period thereon shall be exempt from any and all charge for construction of the irrigation system incurred up to the time of such purchase. All lands allotted to Indians shall bear their pro rata share of the cost of operation and maintenance of the irrigation system under which they lie; and the Secretary of the Interior may withhold from any Indian a sufficient amount of his pro rata share of any moneys subject to distribution to pay any charge assessed against land held in trust for him for operation and maintenance of the irrigation system.

When the payments required by this act have been made for the major part of the unallotted lands irrigable under any system, and subject to charges for construction thereof, the management and operation of such irrigation works shall pass to the owners of the lands irrigated thereby to be maintained at their expense, under such form of organization and under such rules and regulations as may be acceptable to the Secretary of the Interior.

All appropriations of the waters of the reservation shall be made under the provisions of the laws of the State of Montana.

SEC. 3. * * * The Secretary of the Interior is hereby authorized and directed, when the said lands are surveyed, to issue to the Great Northern Railway Company a patent or patents conveying for railroad pruposes such lands at such point or points as in the judgment of the said Secretary are necessary for the use of said railway company in the construction and maintenance of water reservoirs, dam sites, and for right of way for water-pipe lines for use by said railway company in operating its line of railroad over and across said reservation; * * *.

SEC. 10. That if, after the approval of the classification and appraisement, as provided herein, there shall be found lands within the limits of the reservation deemed practicable for irrigation projects under the provisions of the act of Congress approved June 17, 1902, known as the reclamation act, said lands shall be subject to withdrawal and be disposed of under the provisions of said act, and settlers shall pay, in addition to the cost of construction and maintenances provided therein, the appraised value as provided in this act, to the proper officers, to be covered into the Treasury of the United States to the credit of the Indians.

Act of August 24, 1912 (37 Stat. 526): For continuing construction of irrigation systems to irrigate allotted lands of the Indians of the Fort Peck Indian Reservation, in Montana, including necessary surveys, plans, and estimates, $100,000, the same to be reimbursable.

Act of June 30, 1913 (38 Stat. 90): For continuing construction of irrigation systems to irrigate allotted lands of the Indians of the Fort Peck Indian Reserva-

tion, in Montana, including necessary surveys, plans, and estimates, $150,000, the same to be reimbursable.

Act of August 1, 1914 (38 Stat. 593): For continuing construction of irrigation systems to irrigate allotted lands of the Indians of the Fort Peck Indian Reservation, in Montana, including necessary surveys, plans, and estimates, $50,000, the same to be reimbursable, and to remain available until expended: *Provided*, That the Secretary of the Interior is hereby authorized to make allotments in accordance with the provisions of the act of May 30, 1908 (35 Stat. L. 558), to children on the Fort Peck Reservation, who have not received, but who are entitled to, allotments as long as any of the surplus lands within said reservation remain undisposed of, such allotments to be made under such rules and regulations as the Secretary of the Interior may prescribe.

Joint resolution of March 4, 1915 (38 Stat. 1228), reenacted the item of August 1, 1914, for the fiscal year 1916.

Act of May 18, 1916 (39 Stat. 140): For continuing construction of the irrigation systems on the Fort Peck Indian Reservation, in Montana, $100,000 (reimbursable), which shall be immediately available: *Provided*, That the proportionate cost of the construction of said systems required of settlers and entrymen on the surplus unallotted irrigable land by section 2 of the act of May 20, 1908 (35 Stat. 558), shall be paid as herein provided: *Provided further*, That nothing contained in said act of May 30, 1908, shall be construed to exempt the purchaser of any Indian allotment purchased prior to the expiration of the trust period thereon from any charge for construction of the irrigation system incurred up to the time of such purchase, except such charges as shall have accrued and become due in accordance with the public notices herein provided for, and the purchaser of any Indian allotment to be irrigated by said systems purchased upon approval of the Secretary of the Interior before the charges against said allotment herein authorized shall have been paid, shall pay all charges remaining unpaid at the time of such purchase, and in all patents or deeds for such purchased allotments, and also in all patents in fee to allottees or their heirs issued before payment shall have been made of all such charges herein authorized to be made against their allotments, there shall be expressed that there is reserved upon the lands therein described a lien for such charges, and such lien may be enforced, or upon payment of the delinquent charges may be released by the Secretary of the Interior. * * *

The work to be done with the amounts herein appropriated for the completion of the Blackfeet, Flathead, and Fort Peck projects may be done by the Reclamation Service on plans and estimates furnished by that service and approved by the Commissioner of Indian Affairs: *Provided*, That not to exceed $15,000 of applicable appropriations made for the Flathead, Blackfeet, and Fort Peck irrigation projects shall be available for the maintenance, repair, and operation of motor-propelled and horse-drawn passenger-carrying vehicles for official use upon the aforesaid irrigation projects: *Provided further*, That not to exceed $7,500 may be used for the purchase of horse-drawn passenger-carrying vehicles, and that not to exceed $1,500 may be used for the purchase of motor-propelled passenger-carrying vehicles.

That the Secretary of the Interior be, and he is hereby, authorized and directed to announce, at such time as in his opinion seems proper, the charge for construction of irrigation systems on the Blackfeet, Flathead, and Fort Peck Indian Reservations, in Montana, which shall be made against each acre of land irrigable by the systems on each of the reservations. Such charges shall be assessed against the land irrigable by the systems on each said reservation in the proportion of the total construction cost which each acre of such land bears to the whole area of irrigable land thereunder.

On the 1st day of December, after the announcement by the Secretary of the Interior of the construction charge, the allottee, entryman, purchaser, or owner of such irrigable land which might have been furnished water for irrigation during the whole of the preceding irrigation season, from ditches actually constructed, shall pay to the superintendent of the reservation where the land is located, for deposit to the credit of the United States as a reimbursement of the appropriations made or to be made for construction of said irrigation systems, 5 per cent of the construction charge fixed for his land, as an initial installment, and shall pay the balance of the charge in 15 annual installments, the first 5 of which shall be 5 per centum of the construction charge, and the remainder shall each be 7 per centum of the construction charge. The first of the annual installments shall become due and payable on December 1 of the fifth calendar year after the initial installment: *Provided*, That any allottee, entryman, purchaser, or owner may, if he so elects, pay the whole or any part of the construction charges within

any shorter period: *Provided further*, That the Secretary of the Interior may, in his discretion, grant such extension of the time for payments herein required from Indian allottees or their heirs as he may determine proper and necessary, so long as such land remains in Indian title.

That the tribal funds heretofore covered into the Treasury of the United States in partial reimbursement of appropriations made for constructing irrigation systems on said reservations shall be placed to the credit of the tribe and be available for such expenditure for the benefit of the tribe as Congress may hereafter direct.

The cost of constructing the irrigation systems to irrigate alloted lands of the Indians on these reservations shall be reimbursed to the United States as hereinbefore provided, and no further reimbursements from the tribal funds shall be made on account of said irrigation works except that all charges against Indian allottees or their heirs herein authorized, unless otherwise paid, may be paid from the individual shares in the tribal funds, when the same in available for distribution, in the discretion of the Secretary of the Interior.

That in addition to the construction charges every allottee, entryman, purchaser, or owner shall pay to the superintendent of the reservation a maintenance and operation charge based upon the total cost of maintenance and operation of the systems on the several reservations, and the Secretary of the Interior is hereby authorized to fix such maintenance and operation charge upon such basis as shall be equitable to the owners of the irrigable land. Such charges when collected shall be available for expenditure in the maintenance and operation of the system on the reservation where collected: *Provided*, That delivery of water to any tract of land may be refused on account of nonpayment of any charges herein authorized, and the same may, in the discretion of the Secretary of the Interior, be collected by a suit for money owed: *Provided further*, That the rights of the United States heretofore acquired to water for Indian lands referred to in the foregoing provision, namely, the Blackfeet, Fort Peck, and Flathead Reservation land, shall be continued in full force and effect until the Indian title to such land is extinguished.

That the Secretary of the Interior be, and he is hereby, authorized to prescribe such rules and regulations and issue such notices as may be necessary to carry into effect the provisions of this act, and he is hereby authorized and directed to determine the area of land on each reservation which may be irrigated from constructed ditches, and to determine what allowance, if any, shall be made for ditches constructed by individuals for the diversion and distribution of a partial or total water supply for allotted or surplus unallotted land: *Provided*, That if water be available prior to the announcement of the charge herein authorized, the Secretary of the Interior may furnish water to land under the systems on the said reservations, making a reasonable charge therefor, and such charges when collected may be used for construction or maintenance of the systems through which such water shall have been furnished.

Act of March 2, 1917 (39 Stat. 980): For continuing construction of the irrigation systems on the Fort Peck Reservation, in Montana, $100,000 (reimbursable) * * *.

Act of May 25, 1918 (40 Stat. 574): For continuing construction, maintenance, and operation of the irrigation systems on the Fort Peck Indian Reservation, in Montana $50,000 (reimbursable) * * *.

Act of June 30, 1919 (41 Stat. 16): For continuing construction, maintenance, and operation of the irrigation systems on the Fort Peck Indian Reservation, in Montana, $100,000 (reimbursable) * * *.

Act of February 14, 1920 (41 Stat. 408): For continuing construction, maintenance, and operation of the irrigation systems on the Fort Peck Indian Reservation, in Montana, $40,000 (reimbursable).

Act of March 5, 1921 (41 Stat. 1225): For maintenance and operation of the irrigation systems on the Fort Peck Indian Reservation, in Montana, $20,000 (reimbursable).

Act of May 24, 1922 (42 Stat. 559–580): For maintenance and operation of the irrigation systems on the Fort Peck Indian Reservation, in Montana, $19,000 (reimbursable).

Act of January 24, 1923 (42 Stat. 1174): For maintenance and operation of the irrigation systems on the Fort Peck Indian Reservation, in Montana, including the purchase of any necessary rights or property, $30,000 (reimbursable), to be immediately available.

Act of June 5, 1924 (43 Stat. 390): For maintenance and operation of the irrigation systems on the Fort Peck Indian Reservation, in Montana, by and

under the direction of the Commissioner of Indian Affairs, including the purchase of any necessary rights or property, $15,000 (reimbursable).

Act of March 3, 1925 (43 Stat. 1146): For maintenance and operation of the irrigation systems on the Fort Peck Indian Reservation, in Montana, by and under the direction of the Commissioner of Indian Affairs, including the purchase of any necessary rights or property, $8,000 (reimbursable).

Act of May 10, 1926 (44 Stat. 458): For maintenance and operation of the Poplar River, Little Porcupine, and Big Porcupine divisions of the irrigation systems on the Fort Peck Indian Reservation, in Montana, by and under the direction of the Commissioner of Indian Affairs, including the purchase of any necessary rights or property, $9,000 (reimbursable).

Act of January 12, 1927 (44 Stat. 934): For maintenance and operation of the Poplar River, Little Porcupine, and Big Porcupine divisions of the irrigation systems on the Fort Peck Indian Reservation, in Montana, by and under the direction of the Commissioner of Indian Affairs, including the purchase of any necessary rights or property, $9,000 (reimbursable).

4. HISTORY

Reservation established.—The Fort Peck Indian Reservation was established by act of Congress of May 1, 1886 (25 Stat. L. 114), ratifying an agreement dated December 28, 1886, made for the purpose of creating a separate reservation for the Indians "now attached to and receiving rations at the Fort Peck Agency, Mont." Prior to the enactment of the above law, this reservation was a part of a much larger reservation, including all that part of Montana north of the Missouri and Sun Rivers, and east of the Rocky Mountains, which was established for various Indian tribes by Executive order of July 5, 1873.

In pursuance of an agreement made September, 1907, between the Indians of the Fort Peck Reservation and Inspector McLaughlin, representing the Secretary of the Interior, the Interior Department submitted to Congress the draft of a bill which resulted in the act of May 30, 1908, providing for the survey and allotment of lands of the Fort Peck Indian Reservation and the sale and disposal of surplus lands, and authorized and directed the Secretary of the Interior to construct such irrigation projects as were deemed practicable, the cost to be reimbursed from the proceeds of sales of lands within the reservation. In conformity with an understanding or informal agreement between the Reclamation Service and the Bureau of Indian Affairs, entered into at the instance of the Commissioner of Indian Affairs, it devolved upon the Reclamation Service to build "those irrigation projects into which both white and Indian interests enter." This agreement involved the Fort Peck, Blackfeet, and Flathead Resrevation projects in Montana.

While as a result of this understanding or informal agreement the construction work was done by the Reclamation Service, the record shows that the chief irrigation engineer of the Indian Bureau inspected the proposed project prior to the beginning of the work, and that at that time at least the general plans were subject to review and revision by the Indian Bureau; also that later during the course of the work, in 1914, it was inspected and reported upon by a board of engineers and officials of the Indian Bureau, and that in 1917 it was inspected and reported upon by the assistant chief irrigation engineer of the Indian Bureau. After the project had been taken over by the Indian Bureau, which was in March, 1924, the present chief irrigation engineer, W. M. Reed, inspected and reported upon the project July 19, 1924. Mr. Reed seems to have been the first engineer, either of the Reclamation Service or the Bureau of Indian Affairs, to realize and to call attention to the hopeless situation existing.

The plan of development, as outlined by a board of engineers of the Reclamation Service in their report of June 14, 1909, was approved by the Acting Commissioner of Indian Affairs July 12, 1909. This plan contemplated an ultimate development to serve 152,000 acres at an estimated cost of $5,220,000. The project then contemplated embraced seven units as follows: Porcupine unit of 4,000 acres; Little Porcupine unit of 2,000 acres; Poplar River unit of 28,000 acres; Big Muddy unit of 16,000 acres; Missouri River unit of 84,000 acres; Galpin pumping unit of 10,000 acres; and Milk River pumping unit of 8,000 acres.

The first inspection of the proposed project for the Indian Bureau was by the then Chief Irrigation Engineer W. H. Code, in the autumn of 1909 before construction work had started. Mr Code discusses the work about to be undertaken in his report of October 30, 1909, to the Commissioner of Indian Affairs, wherein, although admitting the conclusions of the Reclamation Service engineers "that

the Missouri River offers the only source of water supply for the irrigation of any large body of land on this reservation," and that the proposed Missouri River unit has all the advantages of transportation, yet in view of the estimated reclamation cost, approximating $55 an acre, which was considered extremely high for land in northern Montana, Mr. Code "suggested to Engineer Savage the advisability of starting work first on a small project from Little Porcupine Creek, which his investigations to date lead us to believe will be practicable for the irrigation of some 2,000 acres, giving more time for consideration of the large and expensive project from the Missouri."

Mr. Code's suggestion or recommendation was adopted as evidenced by the fact that plans for the construction of the Missouri River unit—the only possibly feasible project on the Fort Peck Reservation—were abandoned, and work was begun on smaller units having an inadequate water supply.

Quoting further from Chief Engineer Code's report of October 30, 1909:

"If your full board of reclamation engineers assure you that the proposed project is entirely practicable from an engineering standpoint, justification for expending so large a sum in reclaiming their lands could only be on the grounds that it was much better for the Indians and the country at large, that their money should be so expended in reclaiming the deserts of the West, affording them labor and good wages in the meantime (with the subsequent privilege of making long-term leases) rather than that it should be subsequently doled out to them in cash payments. This, in my opinion, is a strong argument in favor of undertaking any feasible irrigation project on a reservation, but for reasons stated, I think that the Missouri River project should be more carefully considered before work is initiated.

"Ultimately this project will be justified, even if it should be found necessary to keep several hydraulic dredgers at work constantly during the irrigation period to free the canal of silt; but at this time, and under the conditions obtaining, its authorization is a question that should be carefully studied before action is taken, and it was with this view that I suggested the commencement of the minor project heretofore mentioned."

Report of commission to investigate irrigation projects on Indian lands (1914).—In July, 1914, five years after the work had been initiated, a commission of Indian irrigation engineers and superintendents was appointed by the Commissioner of Indian Affairs to study conditions and make recommendations as to the future policy to be followed in reference to irrigation projects on the Fort Peck and other reservations. The members of this commission were Superintendents C. B. Lohmiller of the Fort Peck Reservation; A. E. McFatridge, Blackfeet Reservation; F. C. Morgan, Flathead Reservation; and Superintendents of Irrigation W. S. Hanna, L. M. Holt, and Henry W. Dietz. Their report dated September 4, 1914, was later published as House Document No. 1215, Sixty-third Congress, third session.

Explaining their qualifications for the investigation undertaken, it is stated:

"The members of this commission are all men who have been connected with the Indian Service as superintendents of Indian Reservations and engineers on irrigation construction work for a number of years, and from daily contact with Indians are in a position to supply first-hand information from personal experience, especially in reference to Indian character, habits, and peculiarities. Several days were occupied in going over the various irrigation units of the Fort Peck Project, including those constructed, partly constructed, and proposed."

Respecting the attitude of the Indians toward irrigation, it is stated:

"The commission met with about 30 Fort Peck Indians who can hardly be considered fair representatives of the tribe.

"Some of these Indians objected to initiating construction on new units until it has been demonstrated that those constructed or in course of construction are successful.

"Their principal objection to the present policy was that it hypothecated the proceeds from the sale of surplus lands in the construction of irrigation units and leaves no funds with which to meet the necessary expenses incidental to beginning farm operations on a self-supporting basis."

Concerning the value of irrigation to the Fort Peck lands, the commission states:

"Land values vary from $10 to $15 per acre for dry farm lands, and from $50 to $75 per acre for improved irrigated land. The above prices are those prevailing on lands adjoining the reservation.

"At the present time a large number of the Indians are attempting to raise crops by dry farming, but according to their own statements they not only can raise double the crops with irrigation but are sure of crop every year. Under

the present conditions they average about one crop in three years and that one crop is considerably less than it would be with an efficient irrigation system."

Urgency of work to protect water rights.—On page 10 of their report the commission points out what is deemed the imperative necessity that construction work be started on the Big Muddy project before November 14, 1916, in order to protect the Indian title to this water. It is further stated:

"Until the water question gets into the courts it will not be definitely known whether or not the decision in the case of Winters *v.* United States will apply to the streams of this reservation.

"The Big Porcupine and the Big Muddy Creeks are boundary streams, the first on the west and the second on the east side of the reservation. These streams have been overappropriated by the white owners living on adjoining land.

"While many appropriators have undoubtedly lost their rights by failure of construction proof, it is quite possible that they may reappropriate and acquire prior rights if this Government does not perfect its right under the filings made by the Reclamation Service."

Comments on completed work.—It is stated on page 11:

"The commission visited the units completed and those under construction. The location work is all done along economical lines and the canals and structures deigned in accordance with approved engineering principles. The excavation work was all done by Indian labor and was done in a satisfactory manner."

Commission recommends completion of work.—On page 12 of their report, it is stated:

"The work of construction begun by the Reclamation Service on this reservation should be completed at the earliest possible date in order that the allottees may be enabled to derive some income from their irrigable lands and also to save the water rights by construction work and beneficial use."

Inspection and report by assistant chief irrigation engineer (1917).—On May 7–11, 1917, Mr. F. R. Schanck, assistant chief irrigation engineer, Bureau of Indian Affairs, inspected the Fort Peck Reservation as a member of a board of engineers convened for inspecting the irrigation work already completed, and to formulate plans for continuing it. The other members of the board were Messrs. C. P. Williams and R. M. Connor, engineers of the Reclamation Service.

Mr. Schanck, in his report of June 29, 1917, criticizes the Reclamation Service for delay in the construction of the Big Muddy unit, and the Poplar River Reservoir.

Operation and maintenance by Reclamation Service.—After completion of the various units, they were operated and maintained by the Reclamation Service until March, 1924, when the irrigation work on the Fort Peck Indian Reservation was turned over to the Indian Bureau to be operated and maintained by the irrigation division or section of that service.

Inspection and report by Chief Engineer Reed, Bureau of Indian Affairs.—Under date of July 19, 1924, Chief Engineer W. M. Reed, who had inspected the Fort Peck project June 22 to June 28, reported the results of his inspection. The following are excerpts of his report:

"This project is situated in the eastern part of Montana. It has long cold winters and hot short summers. It has a rainfall insufficient to produce paying agricultural crops regularly, but owing to unusual rainfall some years coming during the summer months, crops have been at such times fairly remunerative.

"The lands are mostly owned by Indians who apparently will not farm and white men will not lease under present conditions. Should there be created a demand for any considerable amount of water the water could not be furnished, as all the streams get very low during the irrigating season and there is not now storage capacity for any great amount. The storage reservoirs already constructed are of small capacity and after examination I have little faith in their being able to function to the extent for which they were planned.

POPLAR RIVER UNIT

"I also visited the site of the proposed Poplar River storage and feel that this would at least be a partial failure and great disappointment even if constructed at the enormous cost stated in the estimates—$1,466,109, or $29.80 per acre-foot. The reservoir site is in a broad valley requiring a dam 6,100 feet in length and averaging about 40 feet in height. The width of base would be from 350 to 400 feet. The borings show that sand and gravel predominate under the dam section and my observations lead me to believe that this condition prevails over nearly the whole reservoir site.

"It is obvious that this unit can not be considered as feasible. The land that is now using water is scattered over the whole unit.

BIG PORCUPINE UNIT

"This unit is completed, including a storage reservoir having a capacity of 3,800 acre-feet. * * *

"The storage reservoir is in some respects similar to the Poplar Reservoir site. The reservoir leaks and considerable expense has been incurred in attempts to overcome this condition but without complete success. The spillway provided has been in action but little and shows signs of giving way, due to erosion. In the past it has been the practice to empty the reservoir each fall for fear of damage if the water is left in. An impounding reservoir that can not be used to impound is not a success. This year the spring run-off was small and but little water was in the reservoir when I visited it. If there was any considerable amount of land demanding water there would have been a shortage early in the season.

LITTLE PORCUPINE UNIT

"The lands are cultivated only to a small degree and little interest is shown in irrigation. The unit is an expense without any remedy in sight.

BIG MUDDY UNIT

"The present diversion dam of this unit shows deterioration. It appears to be alkali that is slowly acting upon some of the concrete, and repairs or reconstruction will ultimately be necessary.

"The soil of this unit does not appear to me to be of the best quality. It has the appearance of being heavily charged with alkali and in my opinion should be tested by soil experts before any further expenditures are made."

In concluding his report, Chief Engineer Reed states:

"That the undertaking of irrigation on this reservation at the time and in the manner that it was undertaken was ill advised and that the Government now stands to lose heavily.

"In conclusion I desire to say that I have no remedy that is satisfactory to myself with which to solve this problem, and therefore recommend:

"That the whole situation be considered by representatives of the various activities of the Indian Bureau and such others as you may designate, with the hope that the whole matter may be thrashed out and settled with as little financial loss as possible."

5. LOCATION AND TRANSPORTATION

This reservation is in northeastern Montana, in the Missouri River Valley. In outline it is closely rectangular, being about 80 miles long, east to west, and about 40 miles wide. The Missouri River, flowing easterwardly, is the south boundary of the reservation, and tributary streams of the Missouri—Big Muddy Creek on the east, and Milk River and Porcupine Creek on the west, flowing in a general southerly direction, are the east and west boundaries respectively. The area of the reservation as established in 1886 is given as 2,940,144 acres.

The Great Northern Railway parallels the Missouri River, and continues up the Milk River Valley, thus traversing the southern part of the reservation. The towns of Poplar, Wolf Point, Chelsea, Frazier, and Wiota are on the railroad. Homestead, near the east boundary, and near the Big Muddy unit of the irrigation project, is on a branch railroad to Scoby. The Indian agency is at Poplar, Mont.

An improved highway parallels the railroad at varying distances through the south part of the reservation.

6. RESERVATION LANDS AND ALLOTMENTS

As provided in section 2 of the act of May 30, 1908, allotments of 320 acres grazing land, 2½ to 20 acres timber land, and 40 acres irrigable land, were made to each Indian of the reservation.

In 1913 about 1,226,000 acres of surplus lands were thrown open to settlement. Much of this was filed on and dry farmed for some years; but many of these dry farms are now abandoned.

7. POPULATION

The Indians are of the Yankton and Assinniboine Sioux Tribes and their number as of January 1, 1925, is given as 2,253.

8. CLIMATE

Average elevation irrigable area, 2,050 feet. Range in temperature, 100° to +40°. Average annual precipitation, 13.25 inches.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

Aside from the southern part of the reservation in the Missouri River Valley, which is level, and comparatively narrow level valleys along the various tributary streams within the reservation, the land is gently rolling.

No soil survey has been made. The soil in general is heavy clay or clay loam, and is fertile, except in the Big Muddy Creek Valley, where heavy clay and adobe predominate, and the soil is impregnated with alkali.

No drainage has been provided. It is not believed the Big Muddy Valley could be successfully drained because of unfavorable subsoil conditions.

10. WATER SUPPLY AND WATER RIGHTS

The water supply has always been wholly inadequate for the area under canals. With only 2,730 acres under irrigation during the season 1927, it is complained the water supply was deficient, even though 1927 is rated as a wet year.

The sources of water supply for the four units of the project are small streams having comparatively small drainage areas with average elevations but little above the irrigable lands. Consequently, the stream flow, being the result largely of local precipitation, is erratic. It is not unusual for these streams to cease flowing entirely during the latter part of the irrigation season, and twice within the history of the project the Poplar River, the largest of the streams supplying the project, has been dry after July 15.

There are no satisfactory storage sites, consequently what little storage has been developed has been undependable and excessive in cost.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

The plan as originally contemplated by the Reclamation Service involved the following seven units: Porcupine, 4,000 acres; Little Porcupine, 2,000 acres; Poplar River, 28,000 acres; Big Muddy, 16,000 acres; Missouri River, 84,000 acres; Galpin, 10,000 acres; Milk River, 8,000 acres; total, 152,000 acres at an estimated cost of $5,220,000.

Construction work was confined to four units: Little Porcupine, Poplar River, Big Porcupine, and Big Muddy. Work was begun by the Reclamation Service in October, 1909, on the Little Porcupine unit, which was completed early in 1910. Work was then begun on the Poplar River unit, where the West Side Canal was completed August, 1911, and the East Side Canal in 1914. The Big Porcupine unit was begun October, 1913, and completed 1918. The Big Muddy unit was begun 1918 and completed 1921.

In the following, each of the four units of the project will be briefly discussed:

12. BIG PORCUPINE UNIT

This unit consists of an area of about 5,400 acres in the southwestern part of the reservation near the confluence of the Milk with the Missouri River. There are 42 miles of canals and laterals. The water is from Porcupine Creek, the natural flow being supplemented—as originally constructed and completed in 1918—by a storage reservoir, capacity 3,800 feet, about 45 miles from the irrigable area. The cost of this reservoir was approximately $100,000. The spillway of the reservoir was badly damaged by excessive floods in the spring of 1925. Supervising Engineer Hanna estimated the cost of repairing—following this flood—at approximately $11,000. Unusual floods in the spring of 1927 greatly increased the damage, in fact, so nearly completely wrecked the spillway that in the opinion of your advisers it would not now be feasible to make satisfactory repairs. The only alternative would be the removal of the wrecked spillway and the construction of a new one of a different type and greater capacity, which would probably cost about $30,000. This expense is in no way justified. In fact it is impossible to understand why this reservoir was ever constructed. The dam site is unfavorable from every consideration, the spillway site dangerous and unsatisfactory, the spillway as constructed of insufficient capacity, the reservoir of insufficient capacity for the area irrigable, and, moreover, being at a distance of approximately 45 miles from the irrigable area, much of the water

is lost through seepage in the stream, and it is impossible to regulate reservoir outflow to conform to the project water requirement.

Ownership of land under canals

	Acres
Trust-patent Indian	3,599
Fee-patent Indian	442
White owned	720
Tribal unallotted	633
Total	5,394

Utilization of land.—But little use has ever been made of the irrigation facilities, as is indicated by the following summary, showing the activities and the type of farming for the season 1925:

	Acreage irrigated		Acreage dry farmed	Total average
	Cultivated	Wild hay		
Indians	0	173	30	203
White owners	110	10	197	317
Total	110	183	227	520

It will be noted that in 1925 only 293 acres were irrigated, and of this only 110 acres were actually cultivated, and this was by white owners. The Indians dry farmed 30 acres and irrigated 173 acres of wild hay.

The maximum area cultivated at any time since the project has been in operation was 513 acres in the season of 1926. Of this the Indians farmed 233 acres, growing crops estimated at $4,380 and white owners 280 acres, growing crops estimated at $8,427.

Of the total area of 284 acres irrigated in 1927, only 20 acres were cultivated by Indians, and on this they grew crops with an estimated value of only $300. The total value of crops produced on the 284 acres was estimated at $6,646.

Annual operation and maintenance cost.—The total operation and maintenance cost for 1927 was $1,717.94, or about one-fourth of the total value of crops grown. As the annual operation and maintenance assessment is but $1 per acre, the total operation and maintenance collections will probably not exceed $284, leaving an operation and maintenance deficit of more than $1,400 for the year. If the operation and maintenace cost were apportioned to the acreage actualy irrigated it would amount to slightly above $6 per acre. Apportioned to the acreage for which water supply is deemed sufficient, 500 acres, it would amount to about $3.45 an acre.

Construction cost.—The construction cost of this unit to June 30, 1927, was $256,556.86. The operation and maintenance cost to June 30, 1927, was $33,522.23, or a total of $290,079.39.

The area "under constructed works," having canals, is given as 5,395 acres. However, it is the judgment of your advisers that the water supply, even before the wreck of the reservoir spillway, was not adequate for more than 2,000 acres, which would mean that the acre cost to date would be in excess of $145—about three times what this land reasonably could be expected to pay.

Excluding the reservoir, as undoubtedly it will be completely destroyed by the next big flood which will sweep away the remains of the spillway and the part of the dam adjacent to it, the cost to date of the remaining features of the unit is approximately $190,000. Providing the water supply, without storage, is sufficient for 500 acres, as estimated by the project engineer, the resultant acre cost would be $380. It is stated by some, however, that this stream is occasionally entirely dry during the late summer, so that it appears in the absence of storage, that no irrigation can be attempted with any assurance of success.

The advisers are firmly convinced that the Big Porcupine unit presents a hopeless situation for which there is no possible remedy. Even before the failure of the reservoir spillway, the water supply was inadequate for the area over which the canal system was extended. Without storage it is not probable that the water supply will be adequate for more than 500 acres, and even at that there will undoubtedly be seasons of shortage.

Under the circumstances, it is our judgment that any additional money expended here will simply go to increase the heavy loss that must be sustained.

It is our conclusion that this deplorable failure is the result of inadequate preliminary investigations and studies.

We believe and so recommend that no further construction work be done on this unit; that its operation and maintenance by the Government be immediately suspended and that there be made with purchasers of land, or homesteaders, whatever equitable adjustment may be required under the provisions of existing contracts.

13. LITTLE PORCUPINE UNIT

This unit is in the Missouri River Valley and is favorably located as to transportation facilities, being traversed by the Great Northern Railway. It is 35 miles west of Poplar, the agency headquarters.

Water is taken from Little Porcupine Creek—the natural flow being supplemented by a storage reservoir of 3,900 acre-feet capacity. This reservoir occupies a slight natural depression, around which, in order to secure the present storage capacity, it has been necessary to build an embankment. Being so largely in embankment, it is unsafe, and not dependable. Being of such large area with respect to its depth, the losses through evaporation and seepage are excessive. This unit was completed in 1910 and has been regularly operated since, always at a loss.

The irrigable area is 2,412 acres, all of which is provided with irrigation facilities. There are 14 miles of canals or distributaries.

Ownership of irrigable land

	Acres
Trust patent, Indian land	1,909
Fee patent, Indian land	41
White owned land	386
Tribal or unallotted land	76
Total	2,412

Utilization of land.—But little use has ever been made of the irrigation facilities, as is indicated by the following summary, showing the activities, and the type of farming for the season 1925:

	Acreage irrigated		Acreage dry farmed	Total acreage	Estimated crop value
	Cultivated	Wild hay			
Indians	0	405	57	462	$4,566
White owners	75	168	149	392	4,256
Total	75	573	206	854	8,822

For the season 1925, out of a total of 854 acres reported as being "farmed," only 75 acres were in cultivated crops, and this by white owners. Five hundred and seventy-three acres were in wild hay, and 206 acres dry farmed. The total estimated value of crops grown by Indians is given as $4,566, and estimated value of crops grown by whites as $4,256. It cost the Government to operate and maintain the system for that season $3,484.60. This is at the rate of over $46 per acre for the area actually cultivated under irrigation. Apportioning the operation and maintenance cost to the total area irrigated—75 acres cultivated and 573 acres wild hay—or 648 acres, the cost is more than $5 per acre.

For the season 1927. 397 acres were irrigated and the estimated value of crops produced was $4,922.

In general, there is a tendency, for obvious reasons, on the part of Indian Service employees to make "liberal estimates" of crops and crop values. According to the views of many farmers in this part of Montana, both off and on Indian reservations, the average yield of wild hay is one-half ton per acre, or less, and the price ranges ordinarily from $8 to $14 per ton, so that the average value of the crop is probably about $5 or $6 per acre, thus netting the farmer from $2 to $4 per acre after deducting the cost of cutting and stacking.

Operation and maintenance cost.—For 1927 the operation and maintenance cost was $2,542.49, or at the rate of about $6.50 per acre for the area farmed, 397 acres.

The collections can not exceed $397, leaving an operation and maintenance deficit for the year of $2,145.49.

Irrigation investment.—Construction and operation and maintenance for this unit to January 30, 1927, is $103,058.56, or about $43 per acre for the area reported as irrigable 2 412 acres.

It is stated in various reports that this unit is the one unit of the Fort Peck project that has an adequate water supply for the area under constructed works. The advisers are of the opinion that this statement is unwarranted, presumably being based on the fact that there has never been a water shortage, and without taking into consideration the fact that not over 648 acres has ever been irrigated. It is the judgment of the advisers that the water supply is sufficient for not more than 1,000 acres, and considering the type and construction of the reservoir, we are of the opinion that it is unsafe and that the water supply, even for 1,000 acres, is not dependable.

As but a very small part of the irrigable land of this unit has ever been utilized—for instance, 75 acres cultivated in 1925, an average year—and the unit, in consequence, has always been operated at a loss for which there is no remedy, and as the irrigation cost apportioned to the acreage for which there is an adequate water supply, results in an acre cost of approximately $103, which is at least twice what this land ever could be expected to pay, it is recommended that this unit be abandoned.

14. POPLAR RIVER UNIT

This unit is along the Poplar River to the north of the town of Poplar, Mont., which is the largest town of the reservation and the seat of the Indian agency and school. It was completed in 1915, and has been operated since, always at a loss.

Proposed reservoir.—While the ultimate or proposed irrigable area has been given as 24,000 acres, the acreage under constructed works is 10,594. There are 89 miles of canals or distributaries. A storage reservoir with a capacity of 50,000 acre-feet, at an estimated cost of approximately $1,500,000, has been proposed for this unit. Although recommendation was made by the assistant chief engineer in 1917, looking to the immediate construction of this reservoir, nothing was done, and it is regarded as fortunate by your advisers that this work was delayed. It is our judgment that this proposed feature of the project should be entirely abandoned. From a hurried study of the conditions, we are of the opinion that a reservoir here would be no more of a success than the reservoir on the Big Porcupine unit of this reservation.

Water supply inadequate.—It is stated in various reports that the water supply now available without storage is sufficient for 2,000 acres. It is the opinion of the advisers, however, that there is grave doubt as to whether the supply is adequate for more than 1,000 acres. As a matter of fact, we are informed that during the past season—an unusually wet season—there was serious water shortage although only 1,064 acres were cultivated; and that in consequence of the shortage and consequent alleged injury to crops, the Frye Cattle Co. has submitted a claim for the return of an advance payment of operation and maintenance charged in the amount of $511.

Ownership of irrigable lands

	Acres
Indian owned	8,470
White owned	1,432
Tribal or unallotted	692

Utilization of land.—Acreage farmed season of 1925:

	Acreage irrigated		Acreage dry farmed	Total acreage
	Cultivated	Wild hay		
Indian-owned land	40	299	1,016	1,355
Indian-owned land leased	80	137	680	897
White-owned land	20	47	600	667
Total	140	483	2,296	2,919

The area farmed in 1927 is reported as 1,064 acres. Approximately 300 acres of this was dry farmed. In 1924, 710 acres was irrigated, and in 1925, 623 acres.

Operation and maintenance cost.—The operation and maintenance cost for 1927 was $1,772.84, or about $1.66 per acre reported irrigated. The rate of assessment is fixed at $1 per acre. If the Frye Cattle Co. recover the $500 they claim because of failure to deliver water, and granting that collection will be made on the remaining area, the amount actually recovered will be only $564, or about one-third the actual cost of operation and maintenance.

Irrigation investment.—The total irrigation cost to June 30, 1927, on this unit is $361,195.81, or more than $180 per acre for the acreage for which it is reported the water supply is sufficient. In the opinion of the advisors the water supply is not sufficient for more than 1,000 acres. On this basis the acre-irrigation cost is about $361.

In view of the hopelessness of the situation existing on this unit, it is recommended that operation and maintenance by the Government be discontinued, making whatever adjustment is considered fair and equitable with those who have purchased water rights, and allowing those interested to continue the use of the irrigation facilities at their own expense if they choose to do so.

15. BIG MUDDY UNIT

This unit is in the eastern part of the reservation and is about 40 miles from Poplar, the reservation headquarters. A branch line of the Great Northern Railway passes near the irrigable area, and the town of Homestead on this railroad, and near Big Muddy Creek, the eastern boundary of the reservation, is the shipping point for this unit, as well as for a very extensive dry-farming area to the east of the reservation.

The proposed irrigable area as contemplated by original plans was 16,000 acres. Of this only 4,392 acres are now under canals, of which there are 26 miles. This unit has 2,000 acre-feet of storage. The water supply at present available without further storage is reported to be sufficient for 2,000 acres. This unit was begun 1918 and completed 1921.

The diversion dam, owing to the unsatisfactory quality of material used in the concrete and the presence of alkali, is falling to pieces and will have to be replaced if the operation of this unit is to be continued.

Ownership of land

	Acres
Acreage Indian owned	2,869
Acreage white owned	225
Acreage tribal or unallotted	299

Utilization of land.—Acreage farmed season 1925:

	Acreage irrigated		Acreage dry farmed	Total acreage
	Cultivated	Wild hay		
Indians	0	0	40	40
Lessees	20	520	20	560
White owners	0	0	80	80
Total	20	520	140	680

Practically no farming is done on this unit. The land is almost entirely devoted to wild hay, which is irrigated by the flooding method. Excessive quantities of water are used when available. Much of the land is a heavy adobe or clay and already shows the effects of seepage and alkali, and if operation of this unit were continued it would be only a few years until an extensive drainage system would be necessary to reclaim it.

In 1925 only 20 acres were actually cultivated, and this by a lessee. Indians dry farmed 40 acres, lessees farmed 560 acres, of which 520 acres was wild hay, and one white owner dry farmed 80 acres. The total acreage farmed was 680 acres. The value of wild hay is given as from $10 to $15 per ton, and the yield is about one-half ton per acre.

In 1927 it is reported 900 acres were irrigated—870 acres by lessees and 30 acres by white owners. Only 85 acres, leased land, was actually cultivated.

Operation and maintenance cost.—For 1927 the operation and maintenance cost was $1,149.78, of which it is estimated less than one-half can be collected. The itemized cost of operation and maintenance is:

Salary of ditch riders, three months	$225.00
Maintenance and repairs, cleaning ditches, etc	178.82
Miscellaneous expenses, operating automobile, and repairs	745.96
Total	1,149.78

From this it would appear that dispensing with the automobile would be an economy. The total operation and maintenance cost to June 30, 1927, was $13,857.68.

Construction cost.—The construction cost to June 30, 1927, was $140,020.95. This is in excess of $70 an acre for the 2,000 acres of land for which it is reported there is a water supply. It is the opinion of the advisers that the water supply is sufficient for not more than 1,000 acres. On this basis the construction cost is $140 per acre.

As the Indians themselves are making no use of the land on this unit and it is being operated at a loss of $500 to $1,000 annually, it is believed and so recommended that its operation by the Government should be discontinued.

16. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(*a*) *Construction cost to June 30, 1927*

Reimbursable moneys expended	$811,806.32
Less inventories on hand	7,929.50
Total construction cost	803,896.82

(*b*) *Collection of construction cost*

Total construction assessments to June 30, 1927		$56,760.64
Collections from—		
Indian-owned land	$1,038.52	
White-owned land	4,866.46	
Total collections to date		5,904.98
Unpaid assessments		50,855.66

The first assessments made for the repayment of construction charges on the Fort Peck Reservation were made in pursuance of the act of Congress of February 14, 1920 (41 Stat. 409). The Secretary of the Interior under date of November 29, 1920, promulgated regulations requiring that an assessment be levied against each acre irrigated during the year 1920 of 50 cents per acre, to be due and payable on December 1, 1920, with a penalty of 1 per cent per month if not paid on March 1 next following the due date. The charge for the year 1921 was fixed at 50 cents per acre for all land under constructed ditches. This assessment was to be collected in the same manner as the one levied for 1920. The Solicitor for the Interior Department in an opinion dated November 15, 1921, ruled that the Secretary had no authority of law for assessing the 1 per cent peanlty and it was for this reason canceled.

In a letter approved by the Secretary of the Interior March 28, 1922, charges for construction and operation and maintenance remaining unpaid against land held in Indian ownership during the period 1911 to 1916 were deferred until March 31, 1923. A letter approved April 21, 1923, again deferred all charges against Indian land in accordance with the relief act of February 28, 1923 (Public, No. 454, 42d Cong.). On April 29, 1924, the Assistant Secretary again approved instructions deferring the collections of operation and maintenance and construction charges against Indian lands and on May 16, 1925, the Assistant Secretary approved an order allowing water to be furnished to these lands whether or not the delinquent assessments were paid. No positive instructions have been promulgated requiring these charges to be paid prior to the use of water on land owned by Indians.

(c) Operation and maintenance costs to June 30, 1927

Reimbursable moneys expended	$131,354.81
Collections received and expended	5,797.54
Total operation and maintenance cost to June 30, 1927	137,152.35

(d) Operation and maintenance collections to June 30, 1927

Total operation and maintenance assessments		$14,202.46
Total collections from—		
Indian-owned land	$7,205.21	
White-owned land	4,991.75	
Total collections		12,196.96
Total delinquent asessments to date		2,005.05

The first assessment for operation and maintenance was authorized by the Secretary's letter of May 8, 1922. This authorized the assessment of $1 per acre for all land under application for the first acre-foot, and $1 for each additional acre-foot used. On March 30, 1924, these instructions were modified to the extent that the assessment was to be made on all land which had filed applications regardless of whether or not water was used that particular year. This rate has been continued from year to year without other charges. According to the advice of the engineers in charge of the project, it was deemed unwise to make an assessment that would return the entire cost of operation and maintenance. It was deemed of more importance to get the land under irrigation than to make each season's irrigation pay its own costs. The superintendent advised that if the entire costs were assessed, it would be impossible to lease any of the land in its raw state, and several years must be allowed the lessee before he could be expected to pay the entire cost of operation.

Total of construction and operation and maintenance costs		$941,029.17
Construction cost repaid	$5,904.98	
Operation and maintenance cost repaid	12,196.96	
Total repayments		18,101.94
Total repayments due and unpaid		52,861.16
Total repayments assessed		70,963.10

17. PROJECT PROBLEMS AND COMPLAINTS

It would be difficult to conceive a more hopeless situation than that presented by the Fort Peck Reservation project. It is the opinion of the advisers that the only possible function this project can serve is that of a monument to the futility of attempting to build an irrigation project without a water supply, and in a country where the necessity for irrigation at all is questionable. The inconsequential results attained as compared with the large expenditures, nearly $1,000,000, present a spectacle that is really appalling and humiliating. The most that can be said in palliation of the mistake of those responsible for this scheme is that this project had its inception in the boom days of western land reclamation, when every tract of desert land was considered a potential Garden of Eden by the land-hungering tide of immigraion, and when sound, sober sense and business judgment were temporarily swept aside by unreasoning optimism and enthusiasm.

Notwithstanding the expenditure of nearly $1,000,000 ($941,029.17 to June 30, 1927), there was utilized during the last irrigation season (1927) only 2,730 acres of land, and it is complained that the water supply was insufficient for even this small area, although 1927 is rated as a wet year.

Other causes of project failure.—Aside from the inadequacy of the water supply the project is beset with other conditions that would probably bring about failure even though there were sufficient water. First, there is the possibility of occasionally growing crops without irrigation and the resultant low value of irrigation works as an asset to the land. Many prefer to take their chances at dry farming, and if the weather is favorable and they succeed, they very naturally object to

paying irrigation charges. If the weather is unfavorable, there is a tendency to postpone irrigation in the hope of rain, and thus irrigation is often deferred until the crop is damaged. Frequently in such instances when irrigation water is finally called for, it is not available, so that in the end the dry farmer on the Fort Peck project is not much worse off than the farmer who relies on irrigation.

There is a disinclination on the part of many of the Indians to use the irrigation facilities, since they feel that use would signify their approval and acceptance of the project, and thus obligate them to pay for it. Feeling that the project is an irretrievable blunder, and that it can never be made a success because of the inadequacy of the water supply, they want nothing to do with it. They realize, as must anyone, that the land is worth only a small part of the actual cost of the project. The attitude of the more progressive of the young Indians was thus expressed by their spokesman, in a meeting held with the advisers, "We object to paying for these dry ditches as they are of no use to us. If you will put water in these ditches we will try to pay for them."

Among some of the older Indians there is a superstition against irrigation, apparently arising from the fact that they feel that irrigating is interfering with the plans of the Supreme Being. Their attitude was thus expressed by one of the old leaders—when I plow my land and plant my crop I think of God and I do not need this irrigation.

Utilization of land, season 1927.—The Fort Peck irrigation project represents an expenditure of $941,029.17 to June 30, 1927, being $811,806.32 for construction and $131,354.81 for operation and maintenance.

During the season of 1927 only 2,730 acres were irrigated, which, however, is the largest area irrigated at any time since the project was completed. Of this 2,730 acres, only 904 acres, or practically one-third of the area, was in crops actually cultivated. One thousand three hundred and seventy-eight acres, more than half the irrigated area, was in wild hay, and the remainder, 448 acres, was in alfalfa. Over half the area irrigated, 1,600 acres, was operated by one corporation, the Frye Cattle Co., who own or (and) lease this land. Fifteen Indians farmed on the project during the season, and irrigated 284 acres, most of which was in wild hay. Two of these Indian farmers were agency employees. Lessees irrigated 1,145 acres and white owners irrigated 1,301 acres.

Operation and maintenance costs and collections (1927).—The total cost to the Government for operation and maintenance of the project for the calendar year 1927 was $7,183. The annual operation and maintenance charge assessed against farmers is $1 per acre. Provided collections are made on all land irrigated, which, however, is not probable, the total collections will be $2,730, thus leaving an operation and maintenance deficit for the year of $4,453. The Frye Cattle Co., however, has presented a claim for the return of $500 of their advance payment of operation and maintenance charges, alleging nondelivery of water during the season, and consequent damage to their crops estimated at $10,000. If their claim is allowed, as it probably should be, the operation and maintenance deficit for the year will be approximately $5,000.

Less than 10 per cent of the total accrued operation and maintenance costs have been paid and only about one-sixth of the construction assessments have been collected. The annual construction assessment is fixed at 50 cents per acre while the operation and maintenance annual assessment is $1 per acre.

Operation and maintenance cost and collections, 1921 to 1927, inclusive.—For the 7-year period 1921 to 1927, inclusive, the Government expended for operation and maintenance of the Fort Peck project, $91,711.71, of which during the same period $6,775.85, or about 7 per cent, was collected.

Operation and maintenance cost, 1925.—It cost the Government for operation and maintenance during 1925, $12,490.66, or at the rate of about $36 per acre for the acreage actually cultivated. Considering the entire area irrigated, 2,104 acres, the operation and maintenance cost was approximately $6 per acre.

Operation and maintenance costs as compared with benefits.—It will be noted that the acre crop values as submitted for the Fort Peck project are considerably in excess of those submitted for the Fort Belknap project, where the conditions are very much the same. It is believed that the estimates for the Fort Peck project crop production are not conservative. The average crop value of all crops grown by Indians on the Fort Belknap project for the season of 1926 was $5.66 and for the land in wild hay the average rate was but $3.23 per acre. On the leased land of the Fort Belknap project, the average acre rate was $10.70. It is not probable that the average crop returns on the Fort Peck Reservation are much higher, if any, than on the Fort Belknap project. As a matter of fact the average yield of wild hay is seldom more than one-half ton per acre. Even

granting that it is 1 ton per acre, which is the maximum yield ever secured, the crop value would not ordinarily exceed $6 to $10 per acre. Deducting the cost of irrigating, cutting, and stacking, the net return would not be over $2 to $6 per acre, which it will be seen is frequently less than the actual cost to the Government of operating and maintaining the project.

Reasons for excessive operation and maintenance cost.—The cost of operating and maintaining the Fort Peck project will always be excessive, principally as a result of the fact that the acreage utilized is so widely scattered, making it necessary to maintain and operate an irrigation system covering many times the area actually farmed. For instance, on the Big Porcupine unit, while the area covered by the irrigation system is 5,395 acres, during the season 1925, only 110 acres of this were cultivated by irrigation methods. Taking the entire project during the season of 1925, while 22,794 acres are actually under the irrigation system, only 345 acres were cultivated by irrigation methods. It was necessary as a result of the cultivated area being so widely scattered, to operate and maintain canals covering an area of many times the area actually irrigated.

Condition of irrigation system.—Most of the structures on the canals and laterals being of wood, are in bad condition and will have to be replaced within a few years if the project is continued. Many of the canals are greatly reduced in capacity as the result of the growth of weeds and brush in the deposit of sediment. Because of the small areas irrigated, and the consequent necessity for reducing operation and maintenance expenses, canal cleaning has been neglected for many years, so that if the project is to be continued it will be necessary to clean practically all of the distributaries. If the project is to be continued it will probably be necessary to expend at once not less than $35,000 in the replacement of canal structures and in cleaning canals, to make it possible to operate the project with any degree of efficiency and satisfaction. Ordinarily the cost of operating and maintaining a project of this kind will cost $1 to $1.50 per acre annually for the total acreage under canals, or at least the total acreage under canals that must be operated to deliver water to the acreage actually irrigated.

The Fort Peck project consists of four widely separated units, the Big Porcupine unit about 50 miles west of Poplar, the reservation headquarters; the Little Porcupine unit, about 35 miles west of Poplar; the Poplar River unit which is just north of Poplar; and the Big Muddy unit, about 40 miles northeast of Poplar.

Area under constructed works and water supply.—In various reports on this project, the "irrigable area under constructed works" is given as 22,794.6 acres. The term "irrigable area under constructed works" is, however, misleading, if one is to infer from it, as would be natural, that it can be irrigated. Irrigable area under constructed works is a meaningless term, if and when, as on this project, there is a water supply for only a very small part of the area under canals. The area that is irrigable, that is, possible to irrigate, is dependent of course upon the water supply. The irrigable acreage under constructed works, and the acreage for which the supervising engineer estimates the water supply is sufficient, for each of the four units of this project, are shown in the tabulation below. In the last column is given the acreage for which, in the judgment of the advisers, the water supply is sufficient.

Unit	Acreage under constructed works	Estimated acreage for which water supply is sufficient	
		Project manager	Advisers
Big Porcupine	5,395.4	2,000	[1] 500
Little Porcupine	2,412.2	2,412	1,000
Poplar River	10,594.4	2,000	[1] 1,000
Big Muddy	4,392.6	2,000	1,000
Total	22,794.6	8,412	3,500

[1] These estimates are for only average years. It should be understood that if a dependable all-season water supply is considered, the Big Porcupine and the Poplar River units would have to be counted out, as according to reports there have been two seasons since the construction of the project when no water was available on the Poplar River unit after the middle of July. With the failure of the reservoir on the Big Porcupine unit it is believed the same condition will obtain there.

Ownership of project lands.—The ownership of lands included in the various units of the Fort Peck project are shown by the following tabulation:

	Big Porcupine	Little Porcupine	Poplar River	Big Muddy	Total acres	Per cent, tota
Able-bodies Indians	1,805.8	635.7	4,218.0	1,801.4	8,460.9	38
Old Indians	765.3	689.2	279.3	335.3	2,089.1	9
Deceased	760.3	232.4	885.1	1,020.8	2,898.6	10
Children	727.0	223.5	2,560.8	691.0	4,202.3	19
Whites	743.4	616.4	2,035.3	225.3	3,620.4	17
Unallotted	593.6	15.0	615.9	298.8	1,523.3	7
Total	5,395.4	2,412.2	10,594.4	4,392.6	22,794.6	100

The following tabulation shows the acreage under constructed works on the various units, the mileage of canals, acreage for which water supply is believed sufficient, and the acreage cultivated by irrigation methods during the season of 1925.

	Acreage under canals	Miles canals	Acreage for which water supply is adequate	Acreage cultivated under irrigation, 1925
Big Porcupine	5,395.4	42	500	110
Little Porcupine	2,412.2	14	1,000	75
Poplar River	10,594.4	89	1,000	140
Big Muddy	4,392.6	26	1,000	20
Total	22,794.6	171	3,500	345

Irrigation versus dry farming.—The following tabulation, showing the areas cultivated, irrigated, and dry farmed by Indians and by whites during the season of 1925, which apparently was an average season, will indicate the extent to which dry farming is relied upon even under the irrigation system.

Units of project	Acreage irrigated				Total irrigated	Total dry farmed
	Cultivated		Not cultivated			
	Indians	Whites	Indians	Whites		
Big Porcupine unit	0	110	173	10	293	227
Little Porcupine unit	0	75	405	168	648	206
Poplar River unit	40	100	299	184	623	2,296
Big Muddy unit	0	20	0	520	540	140
Total	40	305	877	882	2,104	2,869

It will be noted by the above table that in 1925 only 40 acres were cultivated by Indians and 305 acres by whites, or a total of 345 acres was cultivated on the entire project; 1,759 acres of the land irrigated was in wild hay. The total area irrigated was 2,104 acres, while during the same season 2,869 acres were dry farmed under the irrigation system.

Obligation to purchasers and lessees.—It is realized that the Government is under certain obligations to supply water to those who have purchased or who are leasing Indian lands, and that if this project is abandoned, as recommended, these obligations can not and ought not to be evaded. It will be necessary to deal with each individual case on its merits, and to make whatever adjustment is fair and equitable under the circumstances. This may involve the payment of some damage claims, or the repurchase of some land. Even though settlement with purchasers and lessees may in the aggregate involve a considerable

sum, it is believed by your advisors that it offers the best way out, and that it will be far less expensive in the long run to make such settlement than to continue the operation of this project in an effort to fulfill the obligation of supplying water. Even though the operation and maintenance of the project should be continued, there frequently will be seasons when water can not be supplied, and in consequence the Government will undoubtedly be confronted with many damage claims. The Frye Cattle Co., a corporation both owning and leasing land on the reservation, allege a loss of $10,000 as the result of nondelivery of water during the season of 1927. Since it will be impossible, because of the inadequacy of the water supply, to operate this project in such a way as to obviate heavy losses to farmers, it seems advisable to cease operation, accepting the present losses rather than to continue with the prospect of facing ever-increasing losses in the future.

The Frye Cattle Co. have land in the Missouri River Valley part of the reservation, which they are irrigating by a pumping plant. It would seem that an arrangement might be worked out whereby they could be given additional land there, for which they can develop a safe and secure water supply by pumping from the Missouri River, in lieu of the land they now have under the Government irrigation system.

Missouri River unit.—It is now agreed by everyone who has made any study of the Fort Peck Reservation, that the engineers of the Reclamation Service were correct in their conclusion, and that the Missouri River offers the only source for a safe and adequate water supply for any considerable area of reservation land.

The Campbell Farm Corporation, formerly engaged in growing wheat on a large scale by dry-farm methods on this reservation, at one time had under consideration a proposal to build a pump plant and an irrigation system for the Missouri River Valley part of the reservation, in consideration of a long-term lease on the land. The proposal was abandoned, as we understand, because of the general agricultural depression. It is believed, however, that the time will come when it may be possible, by granting a lease for an extended period, to have a project of this kind constructed.

In the judgment of the advisers a grave error was made when the plan for constructing the Missouri River gravity unit, as first proposed by the engineers of the Reclamation Service, was abandoned. Even granting that the work would have cost much more than was then estimated, a project taking water from this source would be a real asset in that it would have had that most essential element of a successful project—an adequate and dependable water supply—whereas the project that was built is without this essential element and is therefore worthless.

Irrigation on Shoshone Reservation, Wyo.

1. RECOMMENDATIONS

It is recommended:

1. That necessary surveys and investigations be made for an accurate determination of the productive irrigable area for which there is an adequate water supply available; that selection be made of the lands to be included in the project; and that the boundaries of the project be fixed.

2. That until after the measures above recommended are carried out, there be no further extensions, additions, or permanent improvements to this project.

3. That the measures recommended in the first paragraph above be carried out in accordance with the suggestions and recommendations contained in the general recommendations of this report concerning the determination of productive irrigable areas and water supply.

4. That as only one-third of the land now provided with irrigation facilities is being used, every possible effort be made to increase the area utilized, by leasing and otherwise, if for no other reason than the protection of the water right, and the payment of operation and maintenance charges.

5. That, as the Government has already expended approximately $680,000 more in the operation and maintenance of this project than has been collected, or can in all probability be collected, the most rigid economy be practiced in future operation and maintenance activities; that annual assessments be made adequate to cover expenses, and that collections be rigidly enforced on all white-owned and leased land.

6. That in view of the necessity for economy, the clerical work be done by one clerk instead of two, as at present; that ditch riders be employed only during the irrigation season; and that the construction force be dispensed with.

7. That as approximately 18,000 acres of project land have been sold to whites from whom the irrigation construction cost of approximately $450,000 can not be collected as a result of failure to safeguard the Government's interest in making the sales, no further land sales be made or fee patents be issued unless and until adequate measures are adopted to protect the Government.

8. That the practice heretofore in vogue on this project of making extensions to canals and bringing additional areas under constructed works, while at the same time admitting the adequacy of the water supply is questionable, and also admitting that so far as known there are no storage sites, is deserving of censure.

9. That the claims of individuals, both Indians and whites, who allege they built irrigation ditches of their own before the beginning of the Government construction, and that such ditches were destroyed by the Government work, be investigated and appropriate recommendations made for equitable adjustment.

10. That in all cases where lands were satisfactorily served by individual ditches prior to the Government irrigation construction, but are now included in the Government project, such land be relieved of irrigation construction cost; but be required to pay the annual operation and maintenance charges if leased or in white ownership.

11. That as operation and maintenance assessments on this project are made for fiscal years, thus including in each assessment parts of two irrigation seasons, which in numerous ways causes confusion and dissatisfaction, assessments hereafter be made by calendar years as on other projects, and on the Bureau of Reclamation projects.

2. SYNOPSIS

The Shoshone or Wind River Indian Reservation, in west central Wyoming, was established by the treaty of July 3, 1868, commonly known as the Fort Bridger treaty. By agreement of September 26, 1872, an area adjacent to Lander, in the southern part of the reservation, was ceded to the United States, and by the agreement of June 21, 1904, there was ceded to the United States that part of the original reservation north of the Big Wind River embracing an area of about 1,500,000 acres. A condition of this cession of land was that the United States should sell the land to homesteaders and apply the proceeds of the sale to the benefit of the Indians. The area of the reservation as first established was approximately 2,250,000 acres. The present area is approximately 830,000 acres.

Transportation and markets.—Lander, Wyo., population 12,700, just south of the reservation, is the terminus of a branch of the Chicago & North Western Railroad. This line also connects with the Burlington Railroad about 50 miles northeast of Lander. There are 40 miles of the Atlantic-Yellowstone-Pacific Highway within the reservation.

Allotments.—Allotments were made 1907 to 1915 to all Indians then living, as follows: 330 irrigated agricultural allotments of 80 acres each, total 26,942 acres; 1,500 irrigable agricultural allotments of 40 acres each, total 64,557 acres; 588 grazing allotments of 160 to 330 acres each, total 156,991 acres; total area allotted, 248,490 acres.

At present 1,830 allotments, aggregating 186,322 acres, are held under trust patent; and 50 allotments, aggregating 5,617 acres, are under fee patents; 297 deceased Indian allotments (agricultural and grazing), aggregating 24,196 acres, have been sold at an average price of $10 per acre; 250 allotments (agricultural and grazing), aggregating about 25,000 acres, have been sold at an average price of about $30 by Indians who had received fee patents.

Population and Indian health.—There are two tribes, the Shoshones and Arapahoes, on this reservation. The Indian population for 1927 is given as 1,952, showing an increase of 310 since 1900; 1,206 Indians are full blood; 21 cases of tuberculosis and 185 cases of trachoma are reported. Of 748 families, 549 live in tents and 199 in permanent homes.

Climate.—Range in altitude of irrigable area, 5,000 to 5,600. Range in temperature, 40° to 100°. Average dates last and first killing frosts, May 17 and September 16, respectively. Average annual precipitation 13.92, of which 4.5 inches is in the growing season. The average length of the growing season is 121 days.

Topography.—There has been no topographic survey of the irrigable area The land varies from gently rolling to hilly. Slopes vary from 2 to 20 per cent. Many drops and chutes are necessary in the canals and laterals.

Soil.—No soil survey has been made. The soils range from sandy loam to clay loam. The native vegetation is sagebrush.

Drainage.—Occasional areas are affected by seepage and resultant alkali, but many of these are too small to justify drainage. Some drainage channels have been excavated, but additional drainage is needed, especially in the lower parts of the project.

Cost of preparing land for irrigation.—This ranges from $15 to $30, being about $20 per acre for the average land.

Water supply and water rights.—Water supply is from the Big Wind River and its tributaries within the reservation, and so far has always been adequate.

While all water necessary for irrigation of Indian land is claimed by virtue of the Winters decision, State permits have been secured for all diversions, and these permits are still valid. Filings were made for all diversions as required by the Wyoming statutes during the year 1905 to 1912.

General plan of irrigation development.—The Wind River irrigation project consists of five units on the reservation, and one unit, the LeClair, on the ceded part of the reservation, north of Big Wind River. The five units on the reservation are—

(1) Ray unit: Ultimate irrigable area, 17,995.5 acres; present irrigable area, 14,857.4 acres; irrigated acreage, 7,016; length of canals and laterals, 80 miles; construction cost to date, $382,762.92, or $26 per acre now irrigable; operation and maintenance cost to date, $199,585.57, or $13.40 per acre now irrigable.

(2) Coolidge unit: Ultimate irrigable acreage, 19,553.4; present irrigable acreage, 11,777.5; irrigated acreage, 4,645; canals and laterals 88 miles; construction cost to date, $251,041.46, or $20 per acre now irrigable; operation and maintenance cost to date, $186,527.37, or $13.30 per acre.

(3) Subagency unit: Ultimate irrigable acreage, 12,973.3 acres; now under canals, 11,116.7; irrigated acreage, 4,071; canals and laterals, 18 miles; construction cost to date, $179,272.51, or $17 per acre now irrigable; operation and maintenance cost to date, $123,342.84, or $15 per acre now irrigable.

(4) Upper Wind River unit: Proposed area, 17,413.5 acres; now under canals, 11,237.4 acres; irrigated, 2,076 acres; canals and laterals, 29 miles; construction cost to date, $285,988.41, or $26 per acre now irrigable; operation and maintenance cost, $146,016.71, or $13 per acre now irrigable.

(5) Johnstown unit: Proposed area, 2,208; now irrigable, 2,119 acres; now irrigated, 805 acres; canals and laterals, 5.6 miles; construction cost to date, $11,367.86, or $5.50 per acre irrigable; operation and maintenance cost to date, $27,494.10, or $13 per acre now irrigable.

(6) LeClair unit: Proposed acreage, 8,516.8; now under canals, 5.462.2 acres; now irrigated, 2,000 acres; canals and laterals, 10 miles; construction cost to date, $299,455.40, or $55 per acre now irrigable; operation and maintenance cost to date, $71,884.21, or $13 per acre now irrigable.

Summary of project works.—Canals, capacity 50 to 500 second-feet, 92 miles; laterals, capacity 5 to 50 second-feet, 268 miles; total canals and laterals, 360 miles.

Structures: 16 concrete, costing over $2,000; 205 concrete, costing $500 to $2,000; 322 concrete, costing $100 to $500; 36 wood, costing $100 to $500; 38 metal flumes; 1,800 miscellaneous small structures.

Utilization of land.—The estimated acreage of arable land that will be irrigable, if and when the project is completed as proposed, is 78,660; acreage now possible ot irrigate, that is provided with irrigation facilities is 56,451, of which 18,848 acres, or only one-third is now irrigated. Of the acreage irrigated, 3,321 acres, or about 16 per cent, was not in cultivated crops.

The acreage of Indian-owned land not leased under canal is 36,849, of which the Indians irrigated only 7,977 acres, or 21.6 per cent. Of the lands irrigated by Indians, 5,635 acres were in cultivated crops; 200 Indian families are farming, the average acreage cultivated by each family being 33 acres. Nearly 80 per cent of the land owned by Indians and susceptible of irrigation is not being farmed; 16,603 acres of land, now under canal, are owned by white people, of which 7,955 acres, or 48 per cent, are irrigated, leaving 52 per cent susceptible of irrigation, which is not being farmed. There are 125 white landowners cultivating 6,357 acres or about 50 acres each; 64 lessees irrigated 2,916 acres, of which 2,535 acres were cultivated, the average acreage cultivated being about 40 for each lessee. It will be noted that the white owners and lessees are farming but little more per capita than the Indians.

Principal crops, yields, and returns.—On 6,635 acres cultivated by Indians, the principal crops were 3,455 acres of alfalfa, yielding 1.3 tons, valued at $14 per acre; 1,421 acres wheat, yielding 19 bushels, valued at $19 per acre; 589 acres oats, yielding 30 bushels, valued at $15 per acre. The average value of all crops grown by Indians was $13.11 per acre, or $433 per family engaged in farming.

White owners had in cultivated crops 6,357 acres. Of this, 3,603 acres were in alfalfa, yielding 2 tons per acre, valued at $20 per acre; 1,051 acres of wheat, yielding 19 bushels, valued at $19 per acre; 482 acres of oats, yielding 30 bushels, valued at $15 per acre. The average acre return on all crops grown by white owners

was $21.82. The average acre return on all crops grown by lessees was $20.65. The total estimated crop value for 1926 was $338,447, of which Indian farmers produced $104,581, white owners $173,628.60, and lessees $60,236.45.

Operation and maintenance cost.—Operation and maintenance cost to June 30, 1927 is given as:

Reimbursable money expended	$720, 395. 87
Operation and maintenance collections expended	77, 943. 25
Total	798, 339. 12

Operation and maintenance collections.—Operation and maintenance assessments are based on the area under constructed works, and assessments are computed by dividing the total cost of operation and maintenance for the preceding year by this acreage. The assessments for the various units are not segregated, but are treated as one project, so that the operation and maintenance assessment is uniform for the various units. The assessment for 1924 was $1.50 per acre; 1925, $1.40 per acre; 1926, $1 per acre. A penalty of 7 per cent is assessed against lessees and white owners who are delinquent. Collections are made from white owners and lessees and from such Indians as the superintendent is able to collect.

Total operation and maintenance cost to June 30, 1927	$798, 339. 12
Total assessments to June 30, 1927	468, 986. 80
Total collections to June 30, 1927	118, 217. 87
Total delinquencies	351, 744. 68

The operation and maintenance delinquencies are distributed as follows:

On Indian land not leased	$308, 633. 08
On Indian land leased	4, 142. 21
On white-owned land	38, 968. 39

Construction cost.—The construction cost to June 30, 1927, is given as $1,450,741.71, or an average acre cost of $25.70 for the 56,451 acres now provided with irrigation facilities. Should the development be completed as now contemplated by the Indian Service, it is estimated the irrigable area will be 78,660 acres, and the additional cost $1,140,726 or a total estimated cost of approximately $3,000,000 or about $31.50 per acre.

Collection of construction cost.—Departmental regulations issued in accordance with the act of February 14, 1920, respecting collections of construction cost provided that the first assessment of 5 per cent of the construction cost as of the preceding June should become due November 15, 1920.

In his opinion of September 2, 1921, the Attorney General with respect to purchasers of Indian lands at Government land sales on the Wind River Reservation, held that by reason of the statements made in advertisements announcing the sale of such lands, such purchasers were exempt from the payment of irrigation construction charges. On December 15, 1922, the Solicitor for the Department of the Interior, in an opinion held that with respect to the Wind River Indian Reservation, those who purchased land direct from Indians to whom fee patents had been issued were also exempt from payment of irrigation construction charges.

If the above opinions stand, practically all white-owned land on the Wind River irrigation project is exempt from the payment of construction cost.

The proceeds, both from sales of deceased Indian land by the Government and sales made by Indians who had received fee patents have been distributed among the Indians or their lawful heirs, or are held in trust by the Government for such Indians as are incompetent. Nothing whatever was deducted to cover the charge against these lands for the irrigation construction or for the operation and maintenance.

Assessments of construction charges are being made against Indian owned land, but are not being collected except in a few leases wherein it is specified that the lessee shall pay such assessments during the period of the lease. The Indians claim exemption from the payment of construction charges for the reason that their trust patents contain a clause providing that at the expiration of the trust period the land shall be fee-patented to them free of all encumbrances, etc.

July 23, 1927, Indian Office circular letter No. 1624a changed the rate of construction assessments. Under these instructions the present rates on the various units are: Ray, 40 cents; Coolidge, 24; subagency, 28; upper Wind River, 31; and Johnstown, 10 cents per acre.

Total construction cost to June 30, 1927	$1,450,741.71
Total construction assessments to May 30, 1927	168,957.29
Total collections from Indians	412.27
Collections from white owners	11,978.82
Collections from lessees	401.92
Total construction collections	12,202.01

3. DIGEST OF LEGISLATION, TREATIES, AND EXECUTIVE ORDERS

The act of March 3, 1905 (33 Stat. L. 1016), was an act ratifying the agreement with the Indians residing on the Wind River Reservation ceding approximately one and one-half million acres to the public domain for homestead and sale to whites. This act also appropriated $25,000 for continuing construction and extension of irrigation systems.

Article III, section 3, of the above act provides that there is hereby appropriated, out of any money in the Treasury of the United States not otherwise appropriated, the sum of $85,000 to make the per capita payment provided in article 3 of the agreement herein ratified, the same to be reimbursed from the first money received from the sale of the lands herein ceded and relinquished. And the sum of $35,000, or so much thereof as may be necessary, is hereby appropriated, out of any money in the Treasury of the United States not otherwise appropriated, the same to be reimbursed from the proceeds of the sale of said lands, for the survey and field and office examination of the unsurveyed portion of the ceded lands, and the survey and marking of the out-boundaries of the diminished reservation, where the same is not a natural water boundary. * * *

Article IV of the act of March 3, 1905, supra, provides that of the moneys derived from the sale of said lands the sum of $150,000, or so much thereof as may be necessary, shall be expended under the direction of the Secretary of the Interior for the construction and extension of an irrigation system within the diminished reservation for the irrigation of the lands of said Indians. * * *

Act June 21, 1906 (34 Stat. 384): Appropriated $100,000 to be immediately available and to be reimbursed from the proceeds derived from the sale of surplus lands, as provided by act March 3, 1905.

Act March 1, 1907 (34 Stat. 1052): For the purpose of carrying out the provisions of article four of the agreement ratified by the act of March 3, 1905; appropriated $100,000 for continuing construction of an irrigation system.

Act April 30, 1908 (35 Stat. 97): For continuing the work of construction of an irrigation system within the diminished Shoshone or Wind River Reservation in Wyoming, $125,000; reimbursable.

Act March 3, 1909 (35 Stat. 815): For continuing the work of constructing an irrigation system on the Shoshone Reservation in Wyoming, $100,000; reimbursable.

Act April 4, 1910 (36 Stat. 288): For continuing the work of constructing an irrigation system within the diminished Shoshone reservation in Wyoming, $75,000; reimbursable.

Act March 3, 1911 (36 Stat. 1076): For continuing the work of constructing an irrigation system within the diminished Shoshone Reservation in Wyoming, $50,000.

The act of April 27, 1912 (37 Stat. 91) was an act providing for patents to homesteads on the ceded portion of the Wind River Reservation, where a water right had not been perfected.

The act of August 4, 1912 (37 Stat. 539) appropriated $50,000 for continuing construction and maintenance and operation.

The act of June 30, 1913 (38 Stat. 102) appropriated $50,000 for continuing construction and operation and maintenance.

The act of August 1, 1914 (38 Stat. 608) appropriated $25,000 for continuing construction, operation and maintenance. This act also provided a change be made in the method of reimbursement, making the individual allottee whose land was irrigated responsible for the cost of irrigation construction rather than the total cost being charged against tribal funds as provided in the act of March 3,1905, supra.

Joint resolution of March 4, 1915 (38 Stat. 1228) appropriated $25,000.

The act of May 18, 1916, appropriated $50,000 for construction, maintenance, and operation and $5,000 to be used in the preparation of a report to Congress on the Wind River Irrigation project.

The act of March 3, 1917 (39 Stat. 993) appropriated $150,000 for continuing construction, operation and maintenance.

The act of May 25, 1918 (40 Stat. L. 590) appropriated $50,000 for maintenance and operation; $100,000 for continuing construction and provided that the private lands under the project should pay their pro rata share of the cost of construction.

The act of June 30, 1919 (41 Stat. L. 30) appropriated $100,000 for the continuance of construction work and operation and maintenance and $200,000 for continuing investigation, construction, operation, and maintenance for the project on the ceded part of the reservation and $50,000 for the proportionate share of the cost of constructing a diversion dam and canals on the ceded portion of the Wind River Reservation.

The act of February 14, 1920 (41 Stat. L. 408) appropriated $75,000 for the construction, operation, and maintenance of the diminished reservation; $50,000 for continuing investigations, construction, operation, and maintenance of the Riverton project and $22,000 for extension of canals and laterals on the ceded portion of the reservation.

The act of March 3, 1921 (41 Stat. L. 1225) appropriated $75,000 for construction, operation, and maintenance of the diminished reservation.

The act of May 24, 1922 (42 Stat. L. 559) appropriated $75,000 for continuing construction, maintenance, and operation of the irrigation system on the diminished reservation and provided that not to exceed $10,000 of these moneys might be used in the construction of the Ray Lake Reservoir. It also provided $25,000 for the maintenance and operation and extensions of canals on the ceded reservation.

The act of January 24, 1923 (42 Stat. L. 1174) appropriated $200,000 for continuing construction and operation and maintenance on the diminished reservation and $36,500 for the ceded.

The act of June 5, 1924 (43 Stat. L. 390) appropriated $165,000 for construction, operation, and maintenance on the diminished reservation and $36,500 on the ceded reservation.

The act of March 3, 1925 (43 Stat. L. 1146) appropriated $50,000 for construction, operation, and maintenance on both the ceded and diminished reservation.

The act of May 10, 1926 (44 Stat. L. 458) appropriated $55,000 for the operation and maintenance and extension of canals on both the ceded and diminished reservations.

The act of January 12, 1927 (44 Stat. L. 934) appropriated $40,000 for maintenance and operation and extension of canals on the diminished and ceded portions of the Wind River Reservation.

4. HISTORY

The Wind River Reservation was established by treaty with the Shoshone and Bannock Tribes of Indians on July 3, 1868. This reservation comprised approximately 2,500,000 acres at the time it was established. Approximately 1,500,000 acres of this area have been ceded and the greater portion homesteaded and sold to whites. It is situated in the west central part of Wyoming and extends into the high Rocky Mountains. The western part of the reservation is extremely rough and suited only for grazing purposes. There are considerable areas along the streams that are susceptible of irrigation.

Prior to the establishment of the reservation, the Indians had made their living almost exclusively by hunting and fishing and were a nomadic people unaccustomed to agricultural pursuits, with the exception of a small amount of corn raised along the river bottom. The first irrigation ditch was constructed by Government employees and the Indians about 1885. Captain Ray, of the United States Army, acting Indian agent, expended approximately $5,000 on irrigation in 1894 and this is the first record of money being allotted exclusively for irrigation construction work. From 1894 until 1904 but very little additional construction work was started. In the interim between 1904 and 1912 some work was done on each of the units and water was being used on small areas under these various ditches.

An intensive program was carried on between 1912 and 1925 when the major portion of the present units was completed. According to the act of March 3, 1905, the construction of the irrigation system was to be repaid from tribal funds. The act of August 1, 1914, however, changed this method of reimbursing by making reimbursements a burden on the individual allotments. The regulations covering the first sales of Indian lands under the irrigation system

provided for the sale of the land including a paid-up water right and these purchasers will not be required to reimburse the construction cost. Operation and maintenance assessments have been collected since 1914 and the penalty of 7 per cent per annum has been assessed since 1923.

5. LOCATION, TRANSPORTATION, AND MARKETS

County: Fremont.

Townships and ranges: Twps. 2 S. to 5 N.; Rs. 4 E. to 6 W., Wind River meridian.

Railroads: Chicago & North Western crosses eastern end of diminished reservation for distance of about 17 miles.

Highways and roads: Atlantic-Yellowstone-Pacific Highway graded and graveled about 40 miles. Roads unimproved about 485 miles. Roads graded—not graveled—about 375 miles.

Cities and towns: Lander, 2,700; Riverton, 2,700; Hudson, 250; Arapahoe, 50. These towns are on the railroad. Other towns on the reservation are Wind River, Ethete, Fort Washakie, Crowheart, and Burris.

Railway stations: Lander, Hudson, Arapahoe, and Riverton.

Markets: Local. Shipping markets: Billings, Mont.; Casper, Wyo.; Denver, Colo.; Omaha, Nebr.

Indian agency: Fort Washakie, Wyo.

Irrigation office: Wind River, Wyo.

6. RESERVATION LANDS AND ALLOTMENTS

Area of reservation as first established: 2,268,073 acres.

Area of reservation now: 829,440 acres.

(*a*) *Area, classification and estimated value of individual Indian and tribal lands (approximate.)*

Classification	Acres	Per acre value	Total value
Now irrigated	18,000	$50	$900,000
Under canal—not irrigated	41,000	35	1,435,000
Irrigable—proposed works	34,000	35	1,190,000
Grazing land	361,440	5	1,807,200
Timberland	300,000	3	900,000
Mountainous and waste land	75,000	1	75,000
Total	829,440		6,307,200

This tabulation does not include land bought from Indians by whites.

(*b*) *Allotments.*—The first allotment roll was approved April 29, 1907, and the second November 19, 1915. The number and classification of the allotments made to date are as follows:

Classification	Number	Unit area	Total area
Irrigable	1,500	40 (average)	64,557
Irrigated	339	80 (average)	26,942
Grazing	588	160 to 320	156,991
Total			248,490

Allotments of 1830 aggregating 186,322 acres are now held under trust and 50 allotments, aggregating 5,617 acres, are held under fee patent. Two hundred and ninety-seven agricultural and grazing allotments of deceased Indians or approximately 24,196 acres have been sold at an average price of $10 per acre, or a total estimated sale price of about $242,000.

Approximately 250 agricultural and grazing allotments, aggregating 25,000 acres, have been sold to whites by Indians after receiving fee patents. The average price received was $20 per acre, and the total amount derived by the Indians from this source is estimated at $500,000.

7. POPULATION AND INDIAN HEALTH CONDITIONS

Indian tribes—Shoshone, 976; Arapaho, 976

	1900	1927
Indian population	1,642	1,952
White population	500	1,200

	1910	1927
Indian births	90	92
Indian deaths	44	42

Indians having tuberculosis	21
Indians having trachoma	185
Number of full-blood Indians	1,206
Number of less than full blood	746
Number of Indians receiving rations	100
Indian families living in tents	549
Indians in permanent homes	199

8. CLIMATE

Range in elevation of irrigable areas, 5,000 to 5,600 feet.

Maximum temperature, 100°; minimum temperature, −40°.

Average maximum temperature, 57°; average minimum temperature, 28°.

Average annual precipitation, 13.92; average annual rain, 7.8; average snow, 68.4 inches.

Average date last killing frost, spring, May 17.

Average date first killing frost, fall, September 16.

Average precipitation in growing season, 4.6.

Average growing season, 121 days.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(*a*) *Topography.*—No detailed topographic irrigable survey has been made. Fifteen per cent of the irrigable area has a uniform slope, while the remainder is broken by isolated ridges or depressions. The average cost of clearing, plowing, leveling, and ditching the smoothest of the irrigable land is $15 per acre; for the roughest land, about $30; and for the average land, about $20 per acre.

(*b*) *Soil.*—No soil survey has been made. The soils vary somewhat from sandy loams to clay loams, varying in depth from 1 to 20 feet.

Seepage with attendant alkali affectation occurs at a few places where the steeper slopes give way to the level bottom lands along the streams. Many of the affected areas are too small to justify drainage. About 5 miles of drainage ditches have been dug on the subagency unit and have fully reclaimed all the land formerly affected in that vicinity.

(*c*) *Irrigation methods and water delivery.*—The flooding method of irrigation is in use on this project. Water is delivered on demand, the average head being 2½ second-feet. In some instances, larger heads are used by individuals when several turnouts are operated.

(*d*) *Duty of water.*—The average quantity of water used per season varies from 3 to 10 acre-feet per acre. All figures as to duty of water are simply estimates, as no water measurements to water users are made on this project.

(*e*) *Principal crops and average crop production.*—Three principal crops are, alfalfa, average yield, 1.8 tons; wheat, 19 bushels; oats, 15 bushels.

10. WATER SUPPLY AND WATER RIGHTS

(*a*) *Source.*—The water supply for the reservation is from the Big Wind River and its tributaries. The Ray Lake Reservoir, completed in the spring of 1925, has a capacity of 7,000 acre-feet. All other water used is diverted directly into canals from the streams.

(*b*) *Water rights.*—The reservation claims a right to all the water necessary for the irrigable area in accordance with the Winters decision. However, a State permit has been taken out for all diversions, and these have been kept valid by

applications for extension of time for submitting proof of beneficial use. This applies to both Government ditches and to individual ditches.

The State permits include 13 Government-constructed systems, covering 79,390 acres of land. Permits have also been issued and are now in force, for 98 individual Indian ditches, covering 33,759 acres of land.

The State law of Wyoming limits water appropriations to 1 cubic foot per second for each 70 acres, and this amount is considered ample for this locality. The greater number of the filings were made with the State in 1905 and 1906, but some filings were made at later dates, principally in 1912.

With the exception of one or two cases involving small acreages, there have been no water-right adjudications. In one instance, the State forcibly closed an Indian head gate and this action resulted in a court action, known as the Hampleman case, which resulted in the judge of the Federal court at Cheyenne issuing a permanent injunction against the State officers from any further interference with Indian water rights. This decision was largely based on the Winters decision. Numerous controversies have arisen between this service and various State engineers of Wyoming when they have attempted to extend their jurisdiction within the Wind River Reservation boundaries, but to date no serious interference with Indian water rights has occurred.

It is considered that in so far as the water supply is concerned, the rights to use depend on priority of appropriation, but this has never been exercised between different Indian claimants, and up to the present time there has been no necessity for taking any action along this line. This service acts on the theory laid down in the Winters decision, that priority rests with the Indian ditches, regardless of the dates of outside appropriations.

II. GENERAL PLAN OF IRRIGATION DEVELOPMENT

(*a*) *General plan.*—The Wind River project is divided into five units on the diminished reservation and one Government-constructed unit on the ceded reservation.

Diversions are made from a number of streams, and in some instances independent units divert water from the same stream. The various units are, in some instances, overlapping, but in most cases they are entirely independent of each other and separated by considerable distances.

Only one storage reservoir has been constructed to date. This is the Ray Lake Reservoir, capacity 7,000 acre-feet. The water stored in this reservoir benefits the Ray, Coolidge, and subagency units.

The upper Wind River unit consists of one independent ditch and three other ditches forming a chain and so constructed that surplus water from the upper ditch can be used in the middle ditch and surplus water from the middle ditch can be used in the lower ditch. Some additional water supply will eventually be required for this chain of ditches, and this must be supplied either from storage on one or more of the three streams used in this system or by the construction of another ditch from a stream above the upper ditch. Detailed investigations for possible storage sites have not been made, but from preliminary investigations it is thought that some small storages can be economically constructed on the headwaters of some of the streams.

(*b*) *Divisions or units of project.*—The Ray unit receives water from the South Fork of Little Wind River; has an ultimate irrigable area of 17,995.5 acres; has 14,857.8 acres under constructed works; was begun in 1894 and completed in 1911; main canal, 15½ miles long, with capacity of 370 second-feet; estimated cost of completed system, $565,760; per cent completed, 82; irrigated season of 1926, 7,016 acres; cost of construction per acre, 1926, $21.16. The head gate or diversion works are located 2½ miles west of Fort Washakie.

Irrigable area owned by Indians	13,526
Irrigable area owned by whites	4,469
Area now irrigated by Indians (1926)	4,033
Area now irrigated by lessees (1926)	471
Area now irrigated by white owners (1926)	2,511
Average acre, crop value on Indian-farmed land	$12.51
Average acre, crop value on white-farmed land	20.75
Total construction cost to June 30, 1927	382,762.92
Per-acre construction cost to date	21.27
Total construction cost collected to date	123.40
Total operation and maintenance cost to June 30, 1927	199,585.57
Total accrued operation and maintenance assessments to date	38,985.38

Total per-acre accrued operation and maintenance assessment to date, 1914 to 1926, inclusive	11.50
Total operation and maintenance cost collected to June 30, 1927	32,156.49
Per-acre operation and maintenance cost for—	
1925, $0.78; total	11,604.75
1926, $0.83; total	12,329.32
1927, $1.08; total	16,070.36

The Coolidge unit receives water from Little Wind River; has an ultimate irrigable area of 19,553.4 acres; has 11,777.4 acres under constructed works; 72.95 miles of laterals; was begun 1905; the main canal is 15 miles long, with a capacity of 390 second-feet; estimated cost of completed system, $602,000; it is 60 per cent completed; 4,645 acres were irrigated during the season of 1926; cost of construction per acre to 1926, $12.13. The headgate or diversion works are located 2½ miles east of Fort Washakie.

Irrigable area owned by Indians	16,458
Irrigable area owned by whites	3,095
Area now irrigated by Indians (1926)	2,204
Area now irrigated by lessees (1926)	796
Area now irrigated by white owners (1926)	1,644
Average acre crop value on Indian-farmed land	$13.50
Average acre crop value on white-farmed land	26.25
Total construction cost to date	251,041.46
Per acre construction cost to June 30, 1927	12.84
Per acre construction cost collected	111.47
Total operation and maintenance costs to June 30, 1927	186,527.37
Total accrued operation and maintenance assessments to date	104,455.62
Total per acre accrued operation and maintenance cost to date, 1914 to 1926, inclusive	11.50
Per acre operation and maintenance cost for—	
1925, $1.82; total	21,254.90
1926, $0.93; total	10,919.18
1927, $2.37; total	27,855.97

The subagency unit receives water from the Little Wind River and the Big Wind River; has an ultimate irrigable area of 12,973.3 acres; has 11,116.7 acres under constructed works; the main canals total 18 miles, and have an average capacity of 118 second-feet; the subagency canal was constructed in 1907–8, and the diversion from the Big Wind River in 1897; has 61.99 miles of laterals; the estimated cost of the completed system is $281,500; it is 85 per cent complete; 2,652 acres were irrigated during the season of 1926; the diversion works consist of the subagency canal and left-hand canal; cost of construction per acre, 1926, $14.85.

Irrigable area owned by Indians	10,475
Irrigable area owned by whites	2,498
Area now irrigated by Indians (1926)	926
Area now irrigated by lessees (1926)	927
Area now irrigated by white owners (1926)	2,218
Average per acre crop value on Indian-farmed land	$12.92
Average per acre crop value on white-farmed land	24.00
Total construction cost	179,272.51
Per acre construction cost to June 30, 1927	15.05
Total construction cost collected to date	336.95
Total operation and maintenance costs to June 30, 1927	155,342.84
Total accrued operation and maintenance assessments to date	97,111.76
Total per acre accrued operation and maintenance assessments to date, 1914 to 1926, inclusive	11.50
Total operation and maintenance cost collected to June 30, 1927	22,742.70
Per acre operation and maintenance cost for—	
1925, $1.47; total	16,333.23
1926, $0.88; total	9,814.62
1927, $1.22; total	13,540.19

The upper Wind unit receives water from Big Wind River, Dry Creek, Meadow Creek, and Willow Creek; has an ultimate irrigable area of 17,413.5 acres; has 11,237.4 acres under constructed works; the main canals are 29 miles in length, with an average capacity of 103 second-feet. The diversion works consist of the Big Wind River Ditch No. 2, which is 4 miles northwest of Burris,

Meadow Creek Ditch, Willow Creek Ditch, and Dry Creek Ditch; there are 30.86 miles of laterals. The unit was constructed in 1907–8 and is 65 per cent complete; estimate to complete, $653,300; 2,976 acres irrigated during season of 1926; cost of construction per acre, 1926, $16.18.

Irrigable area owned by Indians	13,648
Irrigable area owned by whites	3,764
Area now irrigated by Indians	619
Area now irrigated by lessees	201
Area now irrigated by white owners	2,156
Average acre crop value on Indian farmed land	$9.80
Average acre crop value on white farmed land	19.20
Total construction cost	285,988.41
Per acre construction cost to June 30, 1927	16.39
Per acre construction cost collected to June 30, 1927	3.47
Total operation and maintenance cost to June 30, 1927	146,016.71
Total accrued operation and maintenance assessments to June 30, 1927	91,112.46
Total per acre accrued operation and maintenence assessments to date, 1914 to 1926, inclusive	11.50
Total operation and maintenance assessments collected to June 30, 1927	22,442.04
Per acre operation and maintenance cost for—	
1925, $1.38; total	15,505.61
1926, $1.41; total	15,815.30
1927, $0.74; total	8,273.46

The Johnstown unit receives water from the Big Wind River; has an ultimate irrigable area of 2,208 acres; has 2,119 acres under constructed works; has 2.4 miles of laterals; 5.6 miles of main canal, with a capacity of 35 second-feet; the diversion point bears south 45° 40′, west 2,305 feet from the east quarter corner section 14, township 2 north, range 1 east; the unit was first built by the Indians and afterwards taken over by the project in 1898; is 96 per cent complete, and the estimated cost to complete is $5,290.84; irrigated, season of 1926, 805 acres; the construction cost per acre in 1926 was $5.10.

Irrigable area owned by Indians	1,513
Irrigable area owned by whites	694
Area now irrigated by Indians (1926)	98
Area now irrigated by lessees (1926)	282
Area now irrigated by white owners (1926)	424
Average acre crop value on Indian-farmed land	$18.15
Average acre crop value on white-farmed land	19.80
Total construction cost	811,367.86
Per acre construction cost to June 30, 1927	5.15
Per acre construction cost collected	None.
Total operation and maintenance cost to June 30, 1927	27,494.10
Total accrued operation and maintenance assessments to June 30, 1927	18,074.97
Total per acre accrued operation and maintenance cost, 1914 to 1926, inclusive	11.50
Total operation and maintenance cost collected to June 30, 1927	5,866.85
Per acre operation and maintenance cost for—	
1925, $1.35; total	2,870.24
1926, $1.03; total	2,173.90
1927, $0.89; total	1,876.83

The LeClair unit receives water from Big Wind River and includes lands on the ceded reservation. The ultimate irrigable area of this unit is 8,516.75 acres. The area under constructed works is 5,462.24 acres. This unit is being operated by the Riverton irrigation district. The main canal is 10 miles long, has a capacity of 212 second-feet, and was constructed 1915–16. There are 52.1 miles of laterals. The construction cost to date is $30.32 per acre, and the unit is approximately 64 per cent complete. Approximately 2,000 acres are being irrigated at the present time. The head gate or diversion works are located 19 miles from Riverton, Wyo.

Irrigable area owned by Indians	5,345
Irrigable area owned by whites	3,171
Area now irrigated by Indians (1926)	95

Area now irrigated by lessees (1926)	238
Area now irrigated by white owners	No data.
Average acre crop value, Indian-farmed land (1926)	$14.40
Average acre crop value, white-farmed land (lessees)	14.40
Total construction cost to June 30, 1927	299,455.40
Per acre construction cost to June 30, 1927	35.00
Total construction cost collected, June 30, 1927	11,793.33
Total operation and maintenance costs to June 30, 1927	71,884.21
Total accrued operation and maintenance assessments to June 30, 1927	32,678.65
Total acre accrued operation and maintenance assessments, June 30, 1927	9.70
Total operation and maintenance cost collected to June 30, 1927	9,290.09
Per acre operation and maintenance cost for 1925	13,163.08
Total operation and maintenance cost for 1926	2,401.61
Total operation and maintenance cost for 1927	1,348.66
Estimated construction cost to complete	1,093,763.00
Estimated per acre cost when complete	31.50

Project now complete, by units:

	Per cent
LeClair	64
Ray	82
Coolidge	60
Subagency	85
Upper Wind	65
Johnstown	96

No detailed estimates for completion of the project have been made as no funds have been available for the necessary surveys. The principal work to be done consists of new laterals and large numbers of structures, betterment work on existing laterals, storage, and drainage. The figures given in the estimated cost for completion are a summation of approximate estimates for the various units.

12. SUMMARY OF PROJECT WORKS

(*a*) *Storage.*—The only storage on this project is the Ray Lake Reservoir of the Ray unit; capacity, 7,000 acre-feet. The dam is an earth embankment (35,616 cubic yards) with a riprapped face (12,000 square yards). It was completed 1925 and cost $67,756.

(*b*) *Canal structures.*—16 concrete structures costing over $2,000 each; 205 concrete structures costing from $500 to $2,000 each; 1 masonry structure costing from $500 to $2,000; 2 wooden structures costing from $500 to $2,000; 322 concrete structures costing from $100 to $500 each; 36 wooden structures costing from $100 to $500 each; 16 metal flumes costing from $100 to $500 each; 22 flumes costing less than $100; 7 concrete flumes costing less than $100; 62 wooden flumes costing less than $100; 222 lateral turnouts costing approximately $100 each; 312 combination concrete and wooden bridges; 125 wooden and 2 concrete bridges less than 150 feet; 9 concrete and 177 wooden and 31 metal culverts with a total length of 3,525 feet.

(*c*) *Canals*

	Miles
Capacity 250 to 500 second feet	21.7
Capacity 50 to 250 second feet	70.2
Capacity 15 to 50 second feet	115.3
Capacity less than 15 second feet	152.58
Total	369.73

(*d*) *Drains*

	Miles
Capacity 200 second-feet	1.5
Capacity 15 second-feet	4.3
Total	5.8

(*e*) *Telephone system.*—There are 24.25 miles of telephone lines on the project and 7 telephone stations.

Individual Indian ditches.—Little Wind River No. 4 heads from Little Wind River in the NE.-SW. sec. 31, T. 1 S., R. 2 E., 2¾ miles; serves 748 acres principally in wild hay. First constructed 1898 by Indians but Government has rebuilt at a cost of $2,082.46.

Little Wind ditch No. 5 heads from the Little Wind River about 2½ miles above the head of the subagency ditch, SW.-NE. sec. 4, T. 1 S., R. 2 N.; serves 698 acres; is 1¼ miles long and constructed in 1880 by the Indians. The Government has spent $702.19 on construction. The principal crop grown is wild hay.

South Fork ditch No. 1 heads near the E. ¼ corner of sec. 2, T. 1 S., R. 2 W.; serves 839 acres; is 2½ miles long and constructed by the Indians in 1880. Takes water from Little Wind River. The Government has spent $808.54 on this ditch. The greater portion of it has been cultivated.

South Fork ditch No. 2 heads near the W. ¼ corner of sec. 2, T. 1 S., R. 2 W.; is 2½ miles long, constructed about 1880. About 329.5 acres have been cultivated. The Government spent $1,031.25 on construction. Takes water from Little Wind River.

North Fork ditch No. 1 heads near the SW. corner sec. 27, T. 1 N., R. 2 W., from Little Wind River; serves 359.6 acres; is 2 miles long; constructed in 1881 by Indians. All the land is cultivated.

North Fork ditch No. 4 heads near S. ¼ corner section 25, T. 1 N., R. 2 W., from Little Wind River; serves 368.7 acres; is 1½ miles long and was constructed by Indians. The Government has spent $632.48 on construction.

In addition to the above, there are 93 other individual or cooperative ditches serving tracts varying from 5 to 500 acres each. On 38 of these ditches the area is approximately 7,298 acres. Most of these were built by the Indians themselves, but on seven the Government assisted to the extent of a total expenditure of about $5,731.96

(*c*) *Present condition of project*

Ultimate irrigable area of project as proposed (acres)	78, 660
Area that can now be irrigated (acres)	56, 452
Area now actually irrigated (season 1925) (acres)	18, 515
Total construction cost of June 30, 1927	$1, 450, 742
Per acre construction cost to June 30, 1927, by units:	
LeClair	35. 00
Ray	21. 27
Coolidge	12. 84
Subagency	15. 05
Upper Wind	16. 39
Johnstown	5. 15

13. Area and utilization of arable and irrigable lands

	1924	1925	1926
(*a*) Utilization of Government project lands (entire project):			
Acreage arable [1]			78, 660
Acreage irrigable [2]			56, 451
Acreage irrigated	17, 433	19, 234	18, 848
Acreage cultivated			15, 527
Total crop value	$250, 506	$329, 810	$538, 447
Average acre crop value	$14. 36	$17. 15	$17. 42
Indians farming	135	184	200
Lessees farming	52	77	64
White owners farming	103	139	126
(*b*) Utilization of land owned by Indians and not leased (Government project, Indians):			
Acreage arable			[3] 55, 701
Acreage irrigable			36, 849
Acreage irrigated	5, 085	6, 548	7, 977
Acreage cultivated			6, 635
Families farming	135	184	200
Cultivated per family			33
Total crop value	$62, 903	$91, 085	$104, 582
Crop value (acre)	$12. 37	$14. 06	$15. 11
Crop value (family)			$433

[1] Acreage arable, ultimate irrigable acreage when project is completed.
[2] Acreage irrigable, now under constructed works.
[3] Diminished reservation only.

13. Area and utilization of arable and irrigable lands—Continued

	1924	1925	1926
(*c*) Utilization of land owned by Indians and leased (Government project, lessees):			
Acreage arable			3,000
Acreage irrigable			2,916
Acreage irrigated	4,122	3,390	2,535
Acreage cultivated			64
Number of lessees	52	77	$60,237
Total crop value	$65,315	$69,144	$20.65
Acre crop value	$15.14	$20.39	
(*d*) Utilization of land owned by whites:			
Acreage arable			17,443
Acreage irrigable			16,602
Acreage irrigated	8,226	9,296	7,955
Acreage cultivated			6,357
Number of owners	103	139	126
Total crop value	$122,287	$169,581	$173,628
Acre crop value	$14.86	$18.24	$21.82

14. Principal crops, crop yields, and returns

Crop	Average yield	Acreage	Average value per acre	Total value
INDIANS				
Alfalfa	1.3 tons	3,455	$14.00	$42,896.20
Barley	28 bushels	126	21.00	2,646.00
Clover	1.1 bushels	82	5.95	487.90
Hay, mixed	1.5 tons	790	10.25	8,097.50
Oats	30 bushels	589	15.00	8,835.00
Wheat	19 bushels	1,421	19.00	26,999.00
Miscellaneous		172	85.00–90.00	14,620.00
Total		6,635		104,581.60
LESSEES				
Alfalfa	1.8 tons	1,239	18.00	22,302.00
Barley	28 bushels	107	21.00	2,247.00
Clover	1.1 bushels	144	5.95	856.80
Oats	30 bushels	228	15.00	3,420.00
Peas	12 bushels	145	23.40	3,393.00
Wheat	19 bushels	248	19.00	4,712.00
Pasture		241	8.00	1,928.00
Miscellaneous		183	85.00–90.00	21,377.65
Total		2,535		60,236.45
WHITE OWNERS				
Alfalfa	2.0 tons	3,603	20.00	72,060.00
Barley	28 bushels	307	21.00	6,447.00
Clover	1.1 bushels	165	5.95	981.75
Corn	17 bushels	69	12.25	845.25
Hay, mixed	1.5 tons	172	10.25	1,763.00
Oats	30 bushels	482	15.00	7,230.00
Peas	12 bushels	271	23.40	6,341.40
Potatoes	122 bushels	35	150.00	5,250.00
Wheat	19 bushels	1,051	19.00	19,969.00
Sugar beets	9.5 tons	117	81.00	9,477.00
Miscellaneous		85	85.00–95.00	7,225.00
Pasture		1,000		36,039.20
Total		6,357		173,628.60

26465—30—PT 6——23

15. Economic conditions among project farmers (Indians)

	1924	1925	1926
Number of Indian farms			200
Indian families farming	135	184	200
Livestock:			
Horses			1,060
Cattle, beef			294
Cattle, dairy			66
Sheep			46
Hogs			290
Estimated value livestock per farm			$266
Equipment: Plows, mowers, tractors, trucks, and autos			$35,656.00
Estimated value equipment per farm			$170.00
Acreage farmed by Indians	5,085	6,548	6,635
Acreage farmed per family	38	36	33
Average crop value per acre	$13.00	$14.00	$13.00
Average crop value per family	$466.00	$495.00	$433.00
Per acre construction assessment against Indians by systems: [1]			
Ray	$19.05	$20.86	$21.16
Coolidge	$10.76	$11.87	$12.13
Subagency	$11.77	$13.96	$14.85
Upper Wind	$14.18	$15.99	$16.18
Johnstown	$4.26	$4.99	$5.10
LeClair		$29.75	$30.17
Per acre operation and maintenance assessments against Indians	$1.50	$1.40	$1.00
Acres Indian land leased irrigated	3,233	3,153.5	2,678
Average rental per acre irrigated	$0.75	$0.75	$0.75
Not irrigated (maximum)	$0.25	$0.25	$0.25
Approximate total rental	$7,000.00	$5,000.00	$5,800.00
Indian land sold irrigable (acres)	None.	20	360
Average sale price per acre, irrigable		$75.00	[1] $7.00
Approximate total sale price		$1,500.00	$2,520.00
Number of Indians receiving payments from timber, agricultural and grazing leases, oil, etc.	1,823	1,850	1,898
Average per capita payment from above sources	$20.00	$20.00	$25.00
Average total payment to Indians from above sources	$36,460.00	$37,000.00	$47,450.00
Indian reimbursable indebtedness	$9,046.00	$6,859.00	[3] $10,239.00
Amount paid on reimbursable indebtedness	$4,926.00	$5,493.00	$5,110.00
Number of Indians receiving rations	100	100	100
Indian tribal fund (amount)			$367,446.00
Source of tribal fund [4]			

[1] The annual assessment was calculated on the basis of 5 per cent of the above per acre costs for the years shown.
[2] Does not include the construction charge; it is the price without the water.
[3] This does not include irrigation costs.
[4] From leases and the tribal herd of cattle.

IRRIGATION ON SHOSHONE RESERVATION, WYOMING

10. Project operation and maintenance. (a) Organization

	Per annum
1 Project engineer	$3,100
1 Principal clerk	1,860
1 Supervisor of ditches	1,860
1 Clerk	1,320
1 Motor truck driver and mechanic	1,380
2 Temporary ditch riders	1,320
4 Regular ditch riders	1,440

The ditch riders' duties consist of looking after the distibution of water to the water users, taking care of the cleaning and operation and maintenance work of their districts. Each is required to have a horse. The Government furnishes an automobile to each of four ditch riders. These automobiles are to be used only in emergency ditch riding and operation and maintenance work. The distance usually patrolled by the ditch rider is about 30 miles per day, with an area of about 5,000 acres.

The incumbents in the positions given above are all furnished quarters, fuel, and light, but deductions are made therefor.

(*b*) *Annual expenses.*—In the calendar year of 1926 the operation and maintenance expenditures were $61,073.14.

Water delivery and patrolling is 16 per cent of the usual appropriation.
Cleaning ditches is 12 per cent of the usual appropriation.
Repairing structures, etc., is 17 per cent of the usual appropriation.
New construction is 30 per cent of the usual appropriation.
General expense is 10 per cent of the usual appropriation.
Miscellaneous purchases is 15 per cent of the usual appropriation.

(c) Comparison with neighboring projects

	Wind River project	Riverton Ditch Co.
Elevation	5,600 feet	4,900 feet.
Growing season	121 days	130 days.
Water supply	Ample	Ample.
Water service	On demand	On demand.
Crops grown	Small grains and hays.	Small grains and hays.
Per acre crop value	$18	$24.
Quality of construction	Good	Good.
Total construction cost	$1,450,741.71	Est. $500,000.
Annual per acre construction assessment	30 cents	Ditch rights valued at $50.
Annual per acre operation and maintenance assessment	$1	75 cents.
Per cent of irrigable land cultivated	One third.	75.

The Riverton Ditch Co. only built the main canal and the laterals were built by the farmers concerned. Their main canal cost about the above amount and the quality of construction is good. The 75 cents per acre operation and maintenance assessment rate covers only the water service from the main canal.

No other private ditches in this vicinity were considered at all comparable with the Government project.

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(a) Construction cost to June 30, 1927

Expended from following funds:		
Reimbursable moneys		$1, 488, 303. 10
Chief engineer's office charge		12, 381. 52
Tribal moneys		895. 08
Purchase and transportation		192. 37
Increased compensation		19, 386. 89
Total		1, 521, 158. 96
Less:		
Costs other than irrigation	$931. 08	
Inventory adjustments	69, 486. 17	
		70, 417. 25
Total construction cost		1, 450, 741. 71
Estimated cost to complete for 22,208 acres, the total proposed ultimate area 78,660 acres		1, 140, 726. 00
Present cost per acre, for 56,451.94 acres (average)		25. 70
Estimated per acre cost when completed		31. 50
Per acre value of land without irrigation		10. 00
Per acre value of land when irrigated		50. 00
Increased per acre value by irrigation		40. 00

(b) Collection of construction cost.—Construction assessments are being made in accordance with the provisions of the act of February 14, 1920. The department regulation beginning the assessment of construction charges provided the the first assessment should become due on November 15, 1920, and should be calculated on the basis of 5 per cent of the per acre construction cost as of the preceding June 30th for the unit under which the land was situated, and that thereafter the charge should be due on November 15 of each year and based on the per acre cost as of the preceding June 30.

The first assessments were made November 15, 1920, and were made against all owners of irrigable land, both Indian and white. The white owners refused to pay the construction assessment, which resulted in the matter being referred to the Attorney General of the United States, who rendered an opinion on September 1, 1921, to the effect that white owners who had purchased land at Government sale where the advertisements stated that a paid-up water right went with the land, could not be assessed a further construction charge. The controversy resulted in a suspension of the order beginning the assessment of construc-

tion charges on this reservation so that the first assessment was made on November 15, 1921.

Under date of December 15, 1922, the Solicitor for the Interior Department rendered an opinion to the effect that construction charge assessments could not be made against those white owners who had purchased their land from fee patent Indians.

These two opinions resulted in the suspension of construction charge assessments against practically every white land owner on the reservation, with the result that the trust patent land is about all the irrigable land that is being assessed construction charges. In some few instances, white men have leased lands with a provision in the lease that they shall pay both operation and maintenance and construction charges during the time of the lease.

Under date of July 23, 1927, a circular letter, No. 1624a, was issued, which changed the assessment rate for construction charge repayments and the rates given below are based on the instructions contained in the last circular.

Total construction assessments to June 30, 1927	$168, 957. 29
Per acre annual construction assessment, as of June 30, 1927, by units:	
Ray unit	.40
Coolidge unit	.24
Subagency unit	.28
Upper wind unit	.31
Johnstown unit	.10
Total construction collections to June 30, 1927	12, 802. 01
Total construction collections to June 30, 1927:	
Indians	412. 27
White owners	11, 978. 82
Lessees	410. 92
Total construction delinquencies to June 30, 1927	156, 155. 28
Total penalties on delinquencies to June 30, 1927	None.
Rate of penalty on delinquencies	None.

(*c*) *Operation and maintenance cost to June 30, 1927.*—Expended from the following funds:

Reimbursable moneys	$720, 395. 87
Maintenance collections	77, 943. 25
Total	798, 339. 12

(*d*) *Operation and maintenance collections to June 30, 1927.*—Operation and maintenance assessments are made yearly on the area under constructed works. Assessments have been made in the late summer against the lands concerned, and are based on the actual cost of operation and maintenance for the fiscal year ending June 30 preceding the due date of the assessment. Beginning with the year 1926, a change was started which will put all operation and maintenance assessments in advance. The assessment for 1926 was for the costs for that year plus one-half the estimated cost for 1927. The assessment for 1927 will cover the unpaid portion of 1927 and the entire estimated cost for 1928.

The policy is followed of "no pay, no water," and those who do not use water and become delinquent are charged a penalty of 7 per cent until paid. The penalty applies to white owners and lessees only.

Collections are made from such moneys as the Indian agent is able to collect from the Indians and from white owners and lessees.

Operation and maintenance assessments are not calculated separately for each unit, but the average for the project is used. This is the only practicable way to handle this matter, as frequently a large amount of work is required during one year on some one or two units and to attempt to assess this whole cost to those individual units during the one year would make a per-acre cost that could not possibly be paid. All the units are comparable as to average operation and maintenance costs over a period of years and the fact that the actual expenditures are high some years and low other years is not a sufficient justification for assessing different rates on the several units. For instance, there was a case one year when the actual operation and maintenance cost on one unit amounted to more than $10 per acre for the assessable area of that unit.

Ordinarily the cost of this unit is quite close to the average for the project but excessive flood damage made the year cited an exception. Much study has been given to this matter and the actual cost for period of several years' duration

has given a general average on all the units that is very close to the average annual cost for the entire project calculated as a whole. The present method of computing assessments is considered fair and satisfactory.

	1925	1926
Operation and maintenance assessments:		
On Indian land not leased	$63,228.55	$55,143.86
On Indian land leased	5,464.48	3,525.65
On white-owned land	9,751.17	10,809.91
Total	78,444.20	69,479.42
Operation and maintenance collections:		
On Indian land not leased		900.47
On Indian land leased	6,399.74	4,558.62
On white-owned land	16,480.42	14,295.52
Total	22,880.16	19,754.52
Operation and maintenance delinquencies:		
On Indian land not leased	63,228.55	54,243.39
On Indian land leased	[1] 935.26	[1] 1,032.97
On white-owned land	6,729.25	[1] 3,485.52
Total	70,893.06	58,761.88
Total operation and maintenance assessments to June 30:		
On Indian land not leased	254,389.69	309,533.55
On Indian land leased	25,388.34	28,913.99
On white-owned land	120,705.10	131,515.01
Total operation and maintenanced collections to June 30:		
On Indian land not leased		900.47
On Indian land leased	20,213.16	24,771.78
On white-owned land	78,250.19	92,545.62
Total operation and maintenance delinquencies to June 30:		
On Indian land not leased	254,389.69	308,633.08
On Indian land leased	5,175.18	4,142.21
On white-owned land	42,454.91	38,969.39

[1] These amounts represent over collections due to the collection of former years' assessments.

Total operation and maintenance assessments to June 30, 1927	$468,986.80
Total operation and maintenance collections to June 30, 1927	118,217.87
Total operation and maintenance delinquencies to June 30, 1927	351,744.68
Total penalties collected to June 30, 1927	1,818.43

The rate of penalty on delinquencies was 7 per cent in 1924, 1925, and 1926. The per-acre operation and maintenance assessments in 1924 were $1.50; in 1925, $1.40; and in 1926, $1.

18. PROJECT DEFECTS, PROBLEMS, AND COMPLAINTS

Irrigation costs not collected or collectible on Indian lands purchased by whites.—Beginning in 1907, allotments of land were made to the Indians of the Wind River or Shoshone Reservation. Following the usual procedure of the Indian Bureau, allotments of deceased Indians have been sold at regularly advertised public sales held for that purpose from time to time, and the proceeds have been divided among the lawful heirs.

In many instances also, Indians having received fee patents for their allotments, have sold all or a part of their land. By these two methods of sale, a considerable acreage of land—much of it in the irrigation project, and provided with an irrigation system and a water supply—has come into white or non-Indian ownership.

The records of the Indian Office show that during the period 1909 to 1914 inclusive, 82 tracts of irrigable land were sold at an average price of $17.44 per acre. Also that in his report of September 3, 1915, made "in compliance with request contained in Indian Office letter (Irrig. 75229—1915) of July 20, 1915, regarding the desirability of establishing a more equitable basis for the sale of irrigated lands on the Wind River Reservation, Wyoming." Supervising Engineer Hanna estimates the cost of the completed irrigation system at $16.70 per acre, and points out that the average price received for land at previous sales ($17.44) "was just a trifle higher than the ultimate cost of putting water on the land." It is also stated that the maximum price received for land then sold was $40 an acre and the minimum $8 an acre, and that quite a number of the tracts were sold for $11 or $12. Mr. Hanna states further:

"I would recommend that if a change be made in the appraised values of irrigated land, offered for sale on the Wind River Reservation, that a general

increase at some fixed percentage of the present appraised value be adopted, and, unless for some special reason, this price should be in every case at least equal to the cost of putting water to the land plus the value of the raw land."

Concluding, Mr. Hanna states:

"In my opinion it is better to hold the land if it can not be sold at a price equal to the cost of the irrigation work plus the value of the raw land. Land values are rapidly increasing in this locality, and it should be only a short time until any of this Indian land will bring a good price when placed on the market."

It is apparent from the report of Supervising Engineer Hanna, and more particularly from the request of the Indian Office for the report, and subsequent correspondence concerning the matter, that the Indian Office had then concluded (September, 1915) that a mistake had been made in selling irrigable land without reference to the cost of the irrigation works, and that thereafter an effort was to be made to secure such a price for the land as would cover the irrigation cost in each case, plus the value of the land itself. The record however indicates that this effort to secure better prices for the land—that is, prices in excess of the irrigation cost—was simply in the interest of the Indian, as apparently there was at that time no thought or intention of withholding from the proceeds of the sales a sufficient amount to reimburse the Government for the construction cost of the irrigation project. In this, the policy of the Indian Office seemed to be based on the assumption, apparently afterwards found to be unfounded and erroneous, that the Government would eventually be reimbursed for the cost of the irrigation project from Indian tribal funds, although this was subsequent to the passage by Congress of the act of August 1, 1914, specifically making irrigation construction cost a personal or individual liability, instead of a tribal liability.

The records, so far as examined, and as interpreted by the advisers, show that while over $600,000 had been appropriated from the Treasury and expended on this project from 1905 to 1912, inclusive, only about $70,000 of the total expenditure during that time had been reimbursed from tribal funds.

Acting upon suggestions and recommendations contained in the report relative to land sales by Supervising Engineer Hanna, the Indian Office, in letter of October 7, 1915, to the superintendent, directs that, "the appraisal on each allotment must be large enough to cover the cost of putting water on the land, plus a fair price for the land itself without water."

The act of August 1, 1914, provides that:

"All moneys expended heretofore or hereafter under this provision shall be reimbursable by the Indians who have adequate funds, to the Government, such reimbursement to be made under such rules and regulations as the Secretary of the Interior may prescribe: *Provided further*, That the Secretary of the Interior is hereby authorized and directed to apportion the costs of any irrigation project constructed for Indians made reimbursable out of tribal funds of said Indians in accordance with the benefits received by such individual Indians so far as practicable from said irrigation project, said costs to be apportioned against such individual Indians under such rules and regulations and conditions as the Secretary of the Interior may prescribe."

For several years following the act of August 1, 1914, no efforts were made to apportion the costs of irrigation works as therein provided, the reason given for such failure being that the irrigation construction costs could not be known until the irrigation systems were completed, and that practically none were at that time completed.

Apparently to remedy this situation, Congress, in the act of February 14, 1920, inserted the following provision:

"The Secretary is hereby authorized and directed to require the owners of irrigable land under any irrigation system heretofore or hereafter constructed for the benefit of Indians and to which water for irrigation purposes can be delivered, to begin partial reimbursement of the construction charges, where reimbursement is required by law, at such times and in such amounts as he may deem best; all payments hereunder to be credited on a per acre basis in favor of the land in behalf of which such payments shall have been made, and to be deducted from the total per acre charge assessable against said land."

In carrying out the terms of the above act of February 14, 1920, the Secretary of the Interior on January 21, 1920, issued instructions to the manager of the Shoshone or Wind River project authorizing him to begin the collection of the cost of constructing this irrigation project. The Secretary's instructions specifically stated that the collection should only be made against those lands where water can be delivered. It also provided that the landowners should pay on or before November 15, 1920, a sum equal to 5 per cent of the entire cost of con-

struction and that they should continue to pay this sum until the entire cost of construction had been paid.

On receipt of these instructions from the Washington office, the manager of the Shoshone or Wind River project prepared and sent to each white landowner and Indian allottee a circular commanding them to make payments in accordance with the instructions of the Secretary of the Interior.

It is evident that the white owners and the Indian allottees through their attorneys filed protests with the department against complying with the instructions they had received. The white owners claim they had paid these costs when they purchased their lands. The Indians claim that under the allotment act of 1887 they were to be given their lands free of all encumbrances.

On October 19, 1920, Assistant Commissioner Meritt sent the following telegram to Mr. Hanna, supervising engineer:

"John B. Kendrick and Benton Hendricks Payne have requested the Secretary to take no further steps collecting irrigation charges Wind River white landowners until they can be heard. Take no further action collection such charges until otherwise instructed."

Since October 19, 1920, no further instructions have been issued from the Washington office authorizing the collection of these construction costs and therefore no efforts have been made by the engineer in charge of this project to collect the same.

The advisers have been unable to determine from the records available as to the acreage of Indian land that through sales either by the Government or by fee patent Indians, has gone into white or non-Indian ownership, and the proceeds distributed among the Indians without reserving any part thereof to reimburse the Government for the construction cost. As the construction cost can not now be collected from the white purchasers or subsequent owners, the total cost of the irrigation system on this land is a loss to the Government. In a few instances of recent sales, white purchasers have been required to enter into a contract to pay irrigation charges.

Irrigation costs on the Wind River project are not a lien against the lands benefited. It would be advisable in the opinion of the advisers to secure legislation making all irrigation expenditures on this, as well as all other reservations, a lien against the land, where such legislation does not already exist.

Construction cost assessments are made under authority of the act of February 14, 1920, and are due and payable on November 15 of each year, and are equal to 5 per cent of the total construction cost as of the preceding June 30.

Collection of irrigation charges from Indians.—On the Wind River Reservation, as on other reservations, where there are Government irrigation projects, and where the Indians are not specifically exempted by law from the payment of irrigation construction charges, the project engineer transmits annually to the superintendent, who is supposed to make the collections from the Indians, statements showing the amounts due from each allottee having irrigable land. The regular procedure is set forth by the superintendent of the reservation in his letter of September 9, 1925, to the Commissioner of Indian Affairs, wherein also is explained the inability of the Indians to pay, in the following words:

"I have before me a letter from W. L. Decker, project engineer, at Wind River, Wyo., inclosing construction statements for the year of 1925, which lists in detail the amounts owed by the Shoshone and Arapahoe Indians of this reservation for construction charges on the various ditches constructed by the Government. These statements are handed me in accordance with instructions from your office dated February 10, 1925.

"As you have heretofore been advised it is as much as these Indians can do to make a living off of their allotments without any additional expense being imposed upon them. It is impossible to make any collections from them for construction charges at this time, and to insist upon much collections will only break down their present farming activities."

Answering this, it is stated in Indian Office letter of September 29, 1925, to the superintendent:

"Assessments of this character are imposed by law, for which reason there does not appear to be any question of changing policy, so no reason at the present time is seen to require any immediate modification of our letter of December 11, 1924. It may be said, however, that no attempt is being made to force trust patent Indians to pay irrigation charges where they are not financially able to do so; * * *"

The difficulty in the collection of irrigation charges from Indian lands on the Wind River Reservation arises from the fact that on this particular reservation

there is no law specifically creating a lien against the Indian lands benefited by the irrigation works. The act of August 1, 1914, provides that the individual Indian whose lands are irrigated within an irrigation project constructed on the reservation where he belongs, shall bear the pro rata cost of such irrigation system determined on a per acre basis, and by the act of February 14, 1920, the Secretary of the Interior was authorized and directed to begin collection of construction charges on a per acre basis from the landowners.

The act of August 1, 1914, in effect, shifted the burden of repayment of irrigation charges from the tribal funds to the individual Indians whose lands were benefited by the irrigation system.

As indicated in the foregoing, it was subsequently held by the Indian Office in letter of April 23, 1926, to the superintendent, that any tribal funds used for irrigation work prior to the passage of the act of August 1, 1914, were properly used; but that subsequent to that act, no authority of law existed for using funds of the tribe in the payment of irrigation construction costs, and that in consequence the $145,592.84 that had been credited to irrigation work in 1917 and 1918 was returned to the tribal fund.

As pointed out in the foregoing correspondence, the Indians of this reservation feel that since their agreement with the Government stipulated that only $150,000, or so much thereof as might be necessary, should be expended for irrigation work, that all money expended in excess of that amount was without their consent, and accordingly they or their lands should not be loaded with the cost. The Government, as in many similar cases, has done as guardian what seemed to be best for its wards, even though its action was not always understood or approved by the wards. This certainly is the only logical procedure. In this particular case, the value of the water rights along that have been safeguarded for the Indians by the irrigation development, is undoubtedly sufficient justification for the irrigation work.

In general, the Indians of this reservation are unable financially to pay construction charges. We believe, however, that all able-bodied Indian farmers should be required to either pay, or contribute labor for at least a part of their operation and maintenance charges, more for the moral effect on the Indians themselves than for anything else. The present system of giving and giving to the Indian from infancy all through life will never make a self-reliant citizen of him, but on the other hand makes him continually more and more dependent upon charity, and less able to take care of himself.

Failure to collect operation and maintenance costs—excessive operation and maintenance deficit.—The operation and maintenance cost on this project to June 30, 1927, was $798,339.12, of which only $118,217.87 has been collected. Thus approximately $680,000 of the money appropriated and expended by the Government in the operation and maintenance of this project has not been repaid by the water users. The records show that of the total expenditure of $798,339.12 only $468,986.80 has actually been assessed, thus leaving approximately $330,000 unassessed. It is found that a large part of this excessive operation and maintenance deficit of nearly $700,000 is the result of the fact that for several years the operation and maintenance assessments were but 60 cents per acre, when as a matter of fact the actual cost to the Government for operating and maintaining the project was from two to four times that amount, or more. Apparently, also, there was no serious effort to make collections of even the small amounts assessed.

In addition to building the irrigation works at a cost of approximately one and one-half million dollars, the Government has contributed practically $700,000 to the operation and maintenance of the project to enable 190 whites and 200 Indians to farm (in 1926) 18,848 acres. This is an operation and maintenance cost of about $37 an acre for the land now actually irrigated, or about $14 an acre for the area probably irrigable under existing works.

The excessive operation and maintenance deficit existing on this project, in the opinion of the advisers, is inexcusable and evidences a lack of appreciation of the necessity for making collections. A rigid policy for collecting operation and maintenance expenses should be formulated and adhered to.

It is believed also that there should be legislation making all operation and maintenance charges, including those past due, a lien on the land.

Failure to utilize irrigable lands.—Only one-third of the land said to be irrigable—that is, provided with irrigation facilities—on this project is being utilized.

The only remedy for this situation, as the Indians are now farming all that they are able to farm or that they will farm, is to lease the unused land. The

terms of lease should be made sufficiently attractive to secure good farmers as lessees.

Here, as on many other reservations, the superintendent complains he can not lease land as the Indians demand a cash rental even on unimproved land. Unless the superintendent has authority under existing law, or necessary legislation is passed, giving him authority to lease Indian land, regardless of the wishes of the Indian, who is simply looking for some easy money by way of cash rental, and cares nothing about whether the Government is ever reimbursed for any part of its expenditures, the already huge operation and maintenance deficit of this project will continue to grow.

Question as to adequacy of water supply.—The present plans of the Indian Bureau contemplates a project, when completed, of 78,660 acres. Already 56,451 acres are said to be provided with irrigation facilities. Only 18,848 acres, or one-third of the area that is now irrigable, are being actually utilized.

In his annual report for 1924, Supervising Engineer Hanna states:

"With one or two exceptions there has always been an ample water supply in the streams on the reservation to meet the requirements of the project at its present state of completion. However, it seems certain that when greater areas are put in cultivation it will become necessary to construct storage reservoirs at numerous points if suitable sites can be found."

The advisers are unable to understand why—when with less than one-third of the land now under the irrigation system being utilized there is an occasional water shortage, and when "it seems certain that when greater areas are put in cultivation it will become necessary to construct storage reservoirs at numerous points." and when apparently it is not known whether "suitable sites can be found"—this project has been extended to its present limits, and why it is proposed to extend it still further to take in an additional area of over 22,000 acres.

In view of the conditions it would seem to be an inexcusable blunder to make any further extensious to this project until there has been made the most searching study and investigation of the water supply.

Irrigable area; classification of land.—In common with practically all of the Indian irrigation projects, one of the greatest needs of this project is an irrigable area survey and classification of land. Until this is made, there is no just or equitable basis on which to compute irrigation construction, and operation and maintenance costs.

Many farmers complain that they are paying irrigation charges on land that can not be utilized, and it is entirely probable that in other instances some are not paying charges on land that is being utilized, and on which charges should be collected.

Errors in construction.—In our inspection of this project, many structures were noted—particularly drops and chutes, most of them of concrete—that, in the judgment of the advisers, are unnecessary. Construction should be adapted to natural conditions. It is unnecessary to build costly concrete drop structures for the purpose of preventing erosion of canals or laterals that are bedded in solid rock or other material that is not easily eroded.

It was also noted that in some instances supposedly permanent concrete structures that have been in use for a few years, but which have fallen to pieces as a result of alkali or poor aggregate, are now being replaced with wood structures. We commend the greater use of wood for structures on projects of this kind, that is, in those locations involving an excessively long haul of cement or concrete aggregate, or in alkalied ground, but it was of course a mistake to have built these structures originally of concrete in view of the existing conditions.

A greater effort should be made to comform construction to existing conditions, and to restrict the irrigation construction cost, in so far as possible, to an amount hat the land can reasonably be expected to pay. Land suitable only for growing alfalfa and small grain can not pay the same construction cost as land suitable for more valuable crops, and in consequence a difference in the type and number of structures is necessary. Most, if not all, these unnecessary structures were built some years ago and not by the present management.

Possibility for greater economy in operation and maintenance.—In the judgment of the advisers, one clerk should be able to handle the clerical work of the project office. As on other projects in the northwest, where the growing seasons are short and the winters correspondingly long and severe, it is the judgment of the advisers that the employment of ditch riders during the entire year is not justified and should be discontinued.

In view of the excessive operation and maintenance deficit on this project, every effort should be made to reduce expenses. It is believed that with this

end in view, many of the smaller ditches serving only Indian land, and now being operated and maintained by the Government, should be turned over to the Indian farmers for operation.

Complaints of Indians.—The principal complaint concerning irrigation by the Indians of this reservation is by reason of the fact, as alleged by them, that numerous ditches which they, either individually or collectively, built in early days, were later either incorporated in the present irrigation systems as built by the Government, or destroyed by the Government construction. In many cases, it is claimed that land which they were formerly irrigating in a manner perfectly satisfactory to them, were later included in the Government irrigation project, and that now they are called upon to pay for this irrigation project which they did not need.

Their complaint is set forth in some detail in a memorandum or petition which they transmitted to the advisers, and which is herewith included.

SHOSHONE INDIAN AGENCY,
Fort Washakie, Wyo., September 20, 1927.

COMMITTEE ON INDIAN IRRIGATION PROJECTS,
Bureau of Reclamation, Denver, Colo.:

In accordance with the agreement reached by the members of the tribal council of the Shoshone, or Wind River Reservation, and the committee, Ray P. Teele, of the Department of Agriculture, Washington, D. C., Porter B. Preston, Bureau of Reclamation, Fort Yuma, Ariz., Charles A. Engle, supervising engineer of the Blackfoot irrigation project, who were appointed by the Secretary of the Interior for the purpose of making an engineering and economic study of irrigation projects on Indian reservations, on August 11, 1927, we wish to submit the following information for the consideration of said committee.

That dating back to 1872, the Indians, under the supervision of Government officials, constructed many irrigation ditches within the boundaries of the Shoshone or Wind River Reservation, for the purpose of diverting water from various streams on said reservation, to lands which were cultivated by members of the Shoshone and Arapahoe Tribes, prior to the date when the United States Government came upon the Shoshone or Wind River Reservation to construct its irrigation system.

These Indian, or private ditches, are given as follows: During the year of 1872, the Indians under the administration of Agent Irwin, constructed an irrigation ditch diverting water from the south fork of Little Wind River to irrigate lands in the valley south of said river.

In the year of 1894, during the administration of Captain Ray, a larger ditch was constructed, diverting water from the same stream, which watered the valleys on the south side of the South Fork of Little Wind River, Crooked and Trout Creeks. The Government, in the construction of the upper end of the present Ray system, followed the original level of the ditch constructed by Captain Ray for a distance of five or six miles, and covers practically the same land in said valleys as were covered by the original Ray ditch.

In the year of 1895, the Indians constructed the Shot Gun and Poor Flesh irrigation ditches; these ditches diverting water from Little Wind River to a point where Milk Creek empties into Little Wind River. The Government, in its construction of the Coolidge and Ray Systems, have covered much of the land originally watered by these two Indian ditches.

In the year of 1883, the Indians constructed the subagency ditch, diverting water from Little Wind River, and covered all of the valley land on the north side of the Little Wind River, and Popoagie River. This land has been taken into the Government system by the Government ditch taken out farther up the river, and seepage from the Government system has alkalied the lands, making them useless for farming purposes, unless drained.

In the year of 1895, the left hand ditch was constructed by the Indians, and water diverted from Big Wind River and emptied into the subagency ditch which was constructed by the Indians in 1883.

The Government constructed another ditch which runs almost parallel to the one constructed by the Indians.

In the year of 1898 the Indians constructed what is known as the Johnstown ditch, which was later enlarged by the Government. The original ditch covered about the same lands as those now covered by the Government canal.

In the year of 1898 the Indians constructed a ditch and head gate as a supply system to the south fork of Sage Creek. This ditch is known as the St. Lawrence Diversion Canal.

That all of the ditches mentioned were constructed by Indian labor, and paid for by rations and issue. Very little, if any, moneys were paid to the Indians, and if so, it was from their own funds which were appropriated for the support and civilization of the Indians of this reservation, under former treaties with the United States Government.

That Dick May, a Shoshone Indian, constructed a private ditch which diverted water from Big Dry Creek and watered the allotments of his immediate family and other Indians' allotments to the east.

That Joseph Calhoun, a white man married to a Shoshone Indian woman, constructed a ditch diverting water from Little Meadow Creek to lands of the Calhoun family. That the lands covered by the May and Calhoun ditches are now under the Government system known as the Upper Wind River No. 2 ditch.

That in the year of 1883, the Washakie ditch, constructed by J. K. Moore, sr., now deceased, diverted water from Big and Little Meadow Creeks, and watered lands belong to Indians. These lands are now under the Dry Creek Canal system.

That when the Government first came upon the Shoshone or Wind River Reservation to construct ditches it was understood by the Indians that the Government was to construct and maintain its ditches for the betterment of the Indians.

That the officials of the Government told the Indians that the Government ditches would furnish them free water, and that no cost would be assessed against them or their lands. Otherwise, it would be unreasonable to believe that the Indians would have consented to have their private ditches destroyed in order to pay for construction, operation, and maintenance of Government ditches, which charges they are unable to pay, and that if relief is not afforded our people, the Government will confiscate lands which were set aside by the Fort Bridger treaty of 1868, for the use and undisputed occupancy of the Shoshone Indians, and in violation of provisions of general allotment act of 1887, which among other things, provides that "If the lands have been allotted in severalty for a period of 25 years the same shall be conveyed to the Indian allottees free from all encumbrance of whatsoever nature."

We further wish to submit to the committee the following recommendations.

That the Secretary of the Interior appoint a committee to look into the matter of the Government destroying the private ditches of the Indians in order that proper adjustment can be made, and our rights protected.

That, no charge for construction, operation, and maintenance be made or required of the Indians as long as the title of the lands are held in trust for the benefit of the Indians by the United States Government.

That a general water adjudication suit be instituted to quiet title to all water rights of the Indians in order to protect our priority from the infringement of the State of Wyoming, or any other States, persons, or corporations.

CHARLES SNYDER,
CHARLES WASHAKIE,
CYRUS SHONGUTSIE,
PERCY WETCHIE,
JOHN ST. CLAIR,
Shoshones.
ROBERT FRIDAY,
HENRY LEE TYLER,
YELLOW CALF,
SAM WOLFRANG,
CHESTER ARMSTRONG,
CHARLES LITTLE ANT,
Arapahoes.

It will be noticed that it is stated in the petition that some of these ditches, however, were built under Government supervision and by "Indian labor, and paid for by rations and issue," and also, however, "very little, if any, moneys were paid to the Indians, and if so, it was from their own funds."

The advisers believe that, prior to collection of construction charges from Indian landowners who had their own ditches, this matter should be the subject of an investigation by the project engineer who should make a survey of such ditches that were built wholly or principally by the Indians themselves, and that all lands that were being satisfactorily irrigated by such ditches prior to the time of the Government construction by which they were destroyed, or within which they were incorporate, should be exempted from payment of

construction charges, so long as in Indian ownership, but should not be exempt from operation and maintenance charges.

Complaints of white or non-Indian land owners and lessees.—In a meeting held with them on August 11, 1927, while on the Wind River Indian Reservation, the white or non-Indian water users made numerous complaints, principally as follows:

The fact that there are but a few improved roads upon the reservation makes it practically impossible to travel anywhere aside from on the two highways. Many of the bridges and culverts built on the road crossings of irrigation canals are in bad condition, and if they are replaced by the irrigation project management, the cost of the work increases the operation and maintenance charges, which the farmers are called upon to pay. These people complain that while they are taxpayers in the county, the only privilege they enjoy is to pay taxes. They state that they can not get appropriations from the county commissioners for building or improving roads on the reservation, and also that they are denied the privilege accorded to citizens everywhere except on Indian reservations, in that they have no voice in the conduct of the irrigation project.

Some complaint was also made concerning drinage and waste water, and it seemed to be the sentiment of the land onwers and lessees that the Government is in their opinion obligated to take care of both drainage and waste water, but when it was pointed out to them that this would of necessity require waste ditches and drainage ditches which would increase the irrigation construction cost, they expressed it as their opinion that they ought not to be required to pay for this and that it should be cared for by a Government appropriation.

Many of the water users gave it as their opinion that the annual operation and maintenance charge, at the present time $1.50 per acre per year, is exorbitant and more than they are able to pay. Many of them express the opinion that $1 an acre should be ample to pay the operation and maintenance charges, and lay up a reserve for emergency.

It is the opinion of the advisers, however, that considering the conditions on the Wind River project, the charge of $1.50 per acre annually for operation and maintenance is very reasonable and is as low as it would be possible to operate and maintain the project under any management. The white land owners were practically unanimous in the opinion that no further construction work should be done on the project until the land now under canals is utilized.

Many of the water users contend that the project should be turned over to the Indians and the whites to operate and maintain, thinking that they would be able to do this work for much less than it can be accomplished under Government management. Practically all water users who expressed themselves stated that under present conditions it would be impossible to lease any of the 32,000 acres of land which are now provided with irrigation facilities, but which are not being used, unless the terms of the lease are made much more attractive than the terms now in vogue. It was suggested by some that it would be necessary to make at least a ten-year lease, as many of the lessees who have taken five-year improvement leases have failed.

Irrigation on Southern Ute Reservation, Colo.

1. RECOMMENDATIONS

It is recommended by the advisers—

1. That in the case now pending in the United States district court at Denver, Colo., entitled "The United States of America *v.* The Morrison Consolidated Ditch Co. et al." the following stipulations be proposed to defendants, in order that justice may be done to all parties:

(*a*) That the defendants accept the priority of right to the use of water for the irrigable acreage of Indian lands under the present project not exceeding the present estimated acreage of 18,336, later to be ascertained by soil survey and land classification.

(*b*) That either by agreement or by a finding of the court the amount of such priority shall be ascertained which was put to a beneficial use on the Indian project prior to the normal low-water flow of the stream being exhausted by other appropriators putting waters of the stream to beneficial use on lands outside of the reservation.

(*c*) That either by agreement or by a finding of the court the amount of water that would be necessary to store in order to supplement the river flow to furnish an ample water supply for the entire irrigable acreage of Indian lands, consideration being given to the amount found due under (*b*) above.

(*d*) That the Government take no action to enlarge the present use of water, until the reservoir capacity found under (*c*) is provided.

2. That the Government construct the necessary reservoir capacity found under (*c*) above.

3. That the cost of constructing storage capacity equivalent to restoring the normal low water stream flow to what it would be if no diversion were made outside the Indian project, shall not be charged to the construction of the irrigation system to be repaid by the land.

4. That the part of the cost (if any) which may be necessary to provide a supplemental water supply for Indian lands over and above that provided by the normal low water flow of the stream as contemplated in (3) above, shall be charged against the lands and distributed equally to all the irrigable acreage of the project.

5. That a soil survey and land classification should be made and the irrigable acreage of the project definitely fixed before any further construction is done.

6. That written contracts shall be made with all parties when individuals or associations of individuals and the Government use irrigation works jointly.

7. That all private structures upon, over, or within the rights of way of canals or other irrigation works of the Government shall be permitted only after approved contracts or revocable permits have been executed.

8. That the final distribution of per acre costs or assessments shall be based upon the acreage hereafter to be established by the soil survey and land classification recommended in (5) above.

9. That a public notice be issued assessing an annual construction charge of 2½ per cent of the estimated cost per acre to date, provided the same shall not exceed $1.25 per acre nor less than 50 cents per acre, provided further, that pending the definite fixing of the irrigable acreage under any given canal by the survey above recommended, the present irrigable acreage used by the project management shall be used in fixing the preliminary per acre cost.

10. That public notice be issued assessing the annual operation and maintenance costs as estimated for the year, payable in advance, provided the per acre cost shall be based on the acreage to which water can be supplied as provided under 1(b) above or the actual cultivated and irrigated amount, depending on which is the greater acreage.

11. That all Indian-owned lands be exempt from the payment of the accrual of construction charges while remaining in a trust patent status, or in Indian ownership, provided, however, the construction charges shall be held as a lien on said lands and shall be payable at the same rates and in the same manner as other private holdings at the time the first payments are due, after title passes from the Indian.

12. That the Government appropriate sufficient funds annually to provide for the Indian allottees' operation and maintenance assessments which shall not be reimbursable, due to the present economic conditions and present state of civilization of these Indians. Their present farm earnings are insufficient to provide for these costs and the collection of the same would discourage their present efforts at farming.

13. That all leasing of Indian lands be placed upon the basis given in the general recommendations.

14. That no further extension of the sale or leasing of Indian lands be permitted until storage is provided as recommended in (2) above.

15. That in establishing the per acre construction costs an item of $73,440.21 now carried as an undistributed amount shall be distributed to the features of the project as far as there is evidence to justify such an allocation. Any remaining amount to be distributed on a per acre basis to the whole project except as to such acreage as is known not to have benefited from said expenditures.

16. That the operation and maintenance cost of $92,450.70 to June 30, 1927, minus any amounts paid or due on special contracts shall be carried to construction and distributed to the proper canals or systems as part of the construction costs.

2. SYNOPSIS

The Southern Ute Reservation, in southwestern Colorado, was established by the treaty of September 9, 1850, and at that time contained mostly rough land suitable only for pasture. The only agricultural land was along the streams, principally on the Pine River. The unallotted lands were opened to settlement in 1899. The records show several small ditches constructed in 1884 and 1885, and about 1895 filing was made with the State covering the estimated amount of water required for the Indians. These claims were contested by the whites and

adjudication suit was filed in 1901, which is still pending. Agreements were made with the whites for joint use of certain canals. The Indian Irrigation Service commenced construction in 1909, and leased the portion of the land which the Indians could not use. The Denver & Rio Grande Western Railroad passes through the allotted lands and there is a graveled highway to Durango. The markets are largely local except shipments of livestock and potatoes to the eastern markets.

Reservation lands and allotments.—The present area of the reservation is 512,000 acres. Allotments were made from 1895 to 1898 when 320 acres were allotted to heads of families, and 160 acres to individuals (80 acres agricultural and 80 acres grazing). A total of 375 allotments were made, amounting to 72,970 acres; 239 allotments now held under trust patent, and 20 allotments, aggregating 3,670 acres have been sold at an average price of $5.85 per acre.

Population and Indian health.—There are 368 Indians of the Ute Tribe on this reservation, of whom 330 are full bloods and 58 are mixed bloods. There are 70 cases of trachoma and 1 case of tuberculosis. No Indians are receiving rations.

Climate.—Elevation, 6,000 to 6,800 feet. Maximum temperature 95°; minimum, 35° below zero. Annual precipitation, 15.89 inches. Average growing season, 180 days.

Topography, soil and drainage.—Approximately half of the land is of fairly uniform slope, the balance being uneven with rocky hillsides. The cost of clearing, plowing, leveling, and ditching is from $10 to $15 per acre. No soil surveys have been made. Seepage is in evidence on approximately 1,200 acres, and about 800 acres are alkalied. The continuous flow method of irrigation is used, and the duty of water is 2 to 5 acre-feet. The principal crops are alfalfa, average yield, 2.3 tons per acre; oats, average yield, 1,000 pounds per acre; native hay, 1.5 tons per acre; and wheat, 1,500 pounds per acre.

Water supply and water rights.—The source of the water supply is Pine River, the area of the drainage basin being 450 square miles. The maximum run-off is 520,000 acre-feet, minimum 150,000 acre-feet. No storage is provided, and the water requirements are 212 second-feet.

The project is served by a number of small canals, filings on which were made in compliance with the State law. The whites began irrigating from the stream in 1877, and with the opening of the unallotted land to entry in 1899 the waters of the stream were soon overappropriated. In 1901 adjudication suit was filed in the State courts, but action was suspended. In August, 1924, the Department of Justice filed suit in the United States district court at Denver to quiet title to the prior claim of Indian ditches to the right to divert 212 second-feet of water. This suit was not based upon the actual amount of water used, but upon the principle involved in the Winters decision. In the beginning all parties were working on the theory that the actual application of water was the controlling element. The white settlers put the unused waters to beneficial use shortly after the reservation lands were thrown open to settlement and claim they were encouraged by the Government to settle, knowing these lands were arid. Many will be financially ruined if the Government's contention is upheld.

The Indians are farming about to the limit, and the balance of the land must be reclaimed by the whites, either through purchase or lease. If not reclaimed, a large part of the Government's investment in the land will not be returned. The operation and maintenance charges are a heavy burden on the smaller acreage. If the principles of the Winters decision are enforced, it will result in taking water enjoyed by other users for many years. The land should be reclaimed and a reservoir constructed to accomplish reclamation rather than to enforce legal rights. The Wapato project case is similar where Congress recognized rights of other users on streams.

General plan of irrigation development.—The system comprises a number of small ditches, developed during the last 50 years, of which the Doctor Morrison and Spring Creek ditches are the most important. The irrigable acreage, proposed and present, construction cost to June 30, 1927, per acre cost, and additional amount required to complete for the largest of these ditches, are as follows:

Ditch	Irrigable acreage		Present construction cost	Per acre cost	Additional required to complete
	Proposed	Present			
Spring Creek	7,243	7,243	$62,489.17	$8.63	$9,000.00
Dr. Morrison	3,596	3,239	118,796.73	36.68	6,000.00
West Side	2,570	2,570	5,619.74	2.19	3,000.00
Ceanaboo	795	795	2,872.10	3.61	3,000.00
Commissioner	738	738	1,340.37	1.82	1,000.00
La Boca	940	591	3,414.75	5.78	2,000.00

Summary of project works.—There is no storage on this reservation. The canal structures consist of the following: 2 concrete canal head gates, 1 concrete spillway, 3 concrete lateral head gates, 13 concrete and pipe lateral head gates, 12 concrete and pipe farm turnouts, 20 pipe farm turnouts, 50 wood farm turnouts, 70 wood bridges and culverts, and 50 steel waterway flumes. There is a total of 90 miles of canals, 8 miles with a capacity of 50 to 100 second-feet, 45 miles with a capacity of 15 to 50 second-feet, and 39 miles with a capacity of less than 15 second-feet.

Area and utilization of irrigable lands.—The estimated acreage of arable land that will be irrigable if and when the project is completed as proposed, is 18,366; acreage now possible to irrigate, that is, provided with irrigation facilities, is 17,800, of which 6,282 acres is now irrigated. All of the irrigated acreage is in cultivation.

The acreage of Indian-owned land not leased, under canal, is 15,560, of which the Indians irrigated only 2,791 acres. The entire irrigated acreage was in cultivated crops. There are 85 families farming, the average acreage cultivated by each family being 35 acres. Nearly two-thirds of the land owned by Indians and susceptible of irrigation is not being farmed.

Two thousand three hundred and forty acres of land, of which 2,240 are susceptible of irrigation, are owned by whites. Of this acreage 1,938 acres are irrigated and cultivated by 35 white owners. There are 30 lessees irrigating and farming 1,375 acres of Indian-owned land.

Principal crops, yields, and returns.—On 2,971 acres cultivated by Indians, the principal crops were 1,540 acres of alfalfa, yielding 1.72 tons, valued at $8.77 per acre; 495 acres of wheat, yielding 1,250 pounds, valued at $18.78 per acre; 105 acres of oats, yielding 100 bushels, valued at $13 per acre; and 600 acres of pasture, valued at $3 per acre. The average value of all crops grown by Indians was $13.17 per acre, or $1,019.45 per family engaged in farming.

White owners had in cultivated crops 1,938 acres: Of this 840 acres were in alfalfa, yielding 2.5 tons, valued at $12.50 per acre; 305 acres of wheat, yielding 164 pounds, valued at $24.55 per acre; 85 acres of oats, yielding 1,200 pounds, valued at $15.60 per acre; 40 acres of corn, yielding 1,425 pounds, valued at $28.50 per acre; and 560 acres of pasture, valued at $3 per acre. The average acre return on crops grown by white owners was $20.54, and by lessees was $20.07. The total estimated crop value for 1926 was $102,170, of which Indian farmers produced $37,355; lessees $26,665; and white owners $38,160.

Economic conditions among project farmers.—Number of Indian families farming, 85; estimated value of stock per farm, $600; value of farm equipment, $200; average payment from leases $4,091; total of tribal funds, $399,869.51.

The total area cultivated by Indians, 2,371, netted the 85 families farming $439.50 per family, or about $100 per capita. It is impossible for them to meet the charges from this income. There is a larger per cent of Indians farming here than on other projects, possibly because of the lack of gainful employment obtainable in the vicinity.

Project operation and maintenance.—The organization on this project consists of one assistant engineer in charge, at $2,400, and one subforeman, performing the duties of ditch rider, at $1,320 less $160 for quarters. The annual expense is $14,820.75.

Construction costs and collections.—The distributed costs to June 30, 1927, amount to $206,911.40, and the undistributed to $73,440.21. No part of the undistributed cost is applicable to the Doctor Morrison Canal. Public notices should be based upon 2½ per cent of construction cost, but both a maximum and minimum amount should be fixed. The notices should state a definite

amount at construction costs seem to be indefinite. Assessments to date amount to $66,478.85, but the major part is on Indian lands which can not pay the costs. Construction costs on Indian lands should become a lien upon the land, but not accrued while in Indian ownership. Collections have been made in the sum of $498.42, from white owners only. No collection has been attempted from Indians. Construction assessments vary from 10 cents to $1.85 per acre per annum.

Operation and maintenance costs and collections.—Operation and maintenance costs to June 30, 1927, amount to $92,450.70. Public notices have been issued and some collections made on the basis of actual cost, total collections being $4,725.23. The records show $2,715.92 still due. Operation and maintenance costs are $12,000 to $13,000 per annum, $8,500 of this amount accruing against nonproducing lands. The Government must look to operation and maintenance cost being put on a self-supporting basis. The cost to date should be transferred to construction, and future operation and maintenance charges should be based on an accurate determination of the irrigable acreage having an adequate water supply.

3. DIGEST OF LEGISLATION, TREATIES, AND EXECUTIVE ORDERS

(*a*) *Legislation—General Indian allotment act, 1887.*—Under the act of May 1, 1888, there was authorized the appointment of a commission of three persons with authority to negotiate with the band of Ute Indians of southern Colorado for such modifications of their treaty and other rights and such exchange of their reservation as may be deemed desirable by said Indians and the Secretary of the Interior. (25 Stat. p. 133.)

Act adopting Ute allotment plan, 1895.—The act of February 20, 1895, was "An act to disapprove of the treaty heretofore made with the Southern Ute Indians to be removed to the Territory of Utah and providing for settling them down in severalty where they may so elect and are qualified to settle. All of those not electing to take lands in severalty on the west 40 miles of the present reservation and in portions of New Mexico and for other purposes." (28 Stat. 677.)

Ute allotment act of 1895.—The act approved February 20, 1895 (28 Stat. 677), section 2, provides:

"That within six months after the passage of this act the Secretary of the Interior shall cause allotment of land, in severalty, to be made to such of the Southern Ute Indians in Colorado as may elect and be considered by him qualified to take the same out of the agricultural lands embraced in their present reservation in Colorado, such allotments to be made in accordance with the provisions of the act of Congress approved June fifteenth, eighteen hundred and eighty, * * * and the treaties heretofore made with said Indians: Provided, That Indians taking allotments as herein provided shall retain their interest in all tribal property."

Section 3 provides for a reservation for these Indians not taking allotments of a portion of the reservation lying in the extreme southwestern part of the State of Colorado, a territory about 40 miles long and 15 miles wide.

Section 4 provides that at the expiration of six months all lands not allotted or reserved shall, by the proclamation of the President, be open to occupation and settlement and shall become a part of the public domain to be sold at not less than $1.25 per acre.

Section 5 provides that the proceeds of the sale of lands originally within the reservation shall be paid in part to the Indians and the balance to be held in the Treasury of the United States in trust for the sole use and benefit of said Southern Ute Indians.

By the proclamation of the President of the United States the Ute Reservation, exclusive of allotments, was opened April 13, 1899. (31 Stat. 1847.)

In 1902 by act of Congress (32 Stat. 256) provisions are made for the granting of a right of way across Indian allotments provided "that no application for such right of way shall be granted unless accompanied by the consent, in writing, of the allottee or allottees whose land may be affected thereby" (32 Stat. 266).

Each of the patents to individual Indians for their allotments contains the following provision:

"Now know ye, that the United States of America, in consideration of the premises and in conformity with the provisions of the first action of said act of Congress approved June 15, 1880, has given and granted by these presents, does give and grant unto the said ——— ———, and to this heirs, the said tract above described, but with the stipulation and limitation contained in the aforesaid act, that the land embraced in this patent shall not be subject to alienation, lease, or encumbrances, either by voluntary conveyance of the grantee or by the

judgment, order, or decree of any court, or subject to taxation of any character, but shall be and remain inalienable and not subject to taxation for the period of 25 years from the date hereof and until such time thereafter as the President of the United States shall see fit to remove the restrictions."

Proclamation opening Ute Reservation.—On April 13, 1899, the President issued a proclamation opening the Ute Reservation to settlement which would include all lands not allotted and not included in the west 40 miles of the old reservation. (31 Stat. 1947.) A schedule of the lands withheld from settlement are shown in 31 Stat. D. 1950–1953.

Act of June 30, 1919 (41 Stat. 3): "For the construction, repair, and maintenance of irrigation systems, and for purchase or rental of irrigation tools and appliances, water rights, ditches, and lands necessary for irrigation purposes for Indian reservations and allotments; for operation of irrigation systems or appurtenances thereto, when no other funds are applicable or available for the purpose; for drainage and protection of irrigable lands from damage by floods or loss of water rights, upon the Indian irrigation projects named below."

Under the foregoing heading the acts of May 18, 1916 (40 Stat. 562) and June 30, 1919 (41 Stat. 3), provide the sums of $9,000 and $8,000, respectively, and of May 24, 1922 (Public, 224), $11,500; January 24, 1923 (Public, 395), $20,000; June 5, 1924 (Public, 199), $14,000; March 3, 1925 (Public, 580), $13,000; May 10, 1926 (Public, 206), $13,000; January 12, 1927 (Public, 541), $10,000, for irrigation work on the Southern Ute Reservation.

In 1921 in the annual appropriation act there was appropriated for * * * "Southern Ute Reservation, Pine River project, $8,000, this amount to be paid out of tribal funds; reimbursable under such rules, regulations, and conditions as the Secretary of the Interior may prescribe."

The Indian appropriation bills for 1910 to 1915, inclusive, 1917, 1918, and 1920 provide no specific appropriation for this project. However, allotments were made from funds appropriated in the general irrigation item "Irrigation, Indian Reservations" during these years, and in other years covered by specific appropriations additional amounts were allotted from this fund, as follows:

1910	$1,780.95	1919	$3,789.75
1911	21,180.29	1920	21,945.13
1912	18,556.07	1921	2,641.83
1913	22,996.73	1922	1,635.06
1914	22,599.61	1924	2,407.77
1915	27,856.04	1925	943.60
1916	9,559.60	1926	1,710.52
1917	12,442.27	1927	2,705.91
1918	19,611.02		

(*b*) *Treaties—The Ute treaty of 1850.*—The first treaty with the Utes was made December 30, 1849, and confirmed by Congress September 9, 1850. (9 Stat. 984.) The Utes were then in possession of Pine River Valley. One of the avowed objects of this treaty as set forth in Article VII thereof was to settle the Indians upon land so that they could make their living by agricultural and pastoral pursuits.

Article VII in part reads:

"And the said Utes further bind themselves * * * as soon as their boundaries are distinctly defined * * * to confine themselves to said limits under such rules as the said Government may prescribe, and to build up pueblos or to settle in such other manner as will enable them most successfully to cultivate the soil, and to pursue such other pursuits as will best promote their happiness and prosperity * * * and to support themselves by their own industry, aided and directed as it may be by the wisdom, justice, and humanity of the American people." (9 Stat. 984.)

The Ute treaty of 1864.—The next treaty with the Utes was made on October 7, 1863, and ratified and confirmed December 14, 1864 (13 Stat. 673), and was made with the Tabequache Band of Utes. By this treaty, a large portion of the middle mountain region of Colorado was reserved to the Indians and they relinquished to the United States all claims to other portions of the land of Colorado theretofore in their possession and claimed by them. The purpose of the treaty amongst others, as shown in Article X, was to encourage agricultural pursuits, for a provision was there made for such Indians as desired "to begin and follow the pursuit of agriculture," and the Government obligated itself to protect these Indians in their land and property.

The Ute treaty of 1868.—The next treaty with the Utes was made July 25, 1868, and approved and proclaimed November 6, 1868. (15 Stat. 619.) By this treaty an area of Colorado west of the one hundred and seventh degrees of longitude and south of a line parallel to the fortieth degree of latitude and 15 miles north thereof, was set aside to the Ute Indians; the Ute Indians thereby relinquishing all claims to other lands in the United States and Territories. The Indians were given a much smaller territory, and ample provisions for their becoming self-supporting as agricultural and pastoral people.

It should be noted that every foot of land embraced in the watersheds of the Animas and Pine Rivers was within the Indian reservation established by the treaty of 1868, by which this tract of land was "set apart for the absolute and undisputed use and occupation of the Indians."

Article VII provided that the United States might pass laws for the allotment government and division of the Indian property and that the President might order survey of the reservation and when so surveyed, Congress should provide for protecting the rights of such Indians.

The Ute treaty of 1874.—On September 13, 1873, an agreement was entered into with the Ute Indians which was ratified and confirmed by Congress on April 29, 1874 (18 Stat. 36), by which the Utes relinquished to the United States a large portion of the reservation established by treaty in 1868, leaving for itself only a strip of land in the southwest corner of the State, bordering on New Mexico, 15 miles wide, extending from the one hundred and seventh degree of longitude west about 140 miles to the Utah line, embracing the lower valleys of the San Juan, Piedra, Los Pinos, Florida, Las Animas, La Plata, and Mancos Rivers in Colorado. At this time the "Ute 5 per cent fund" was established.

Thus we find that two years before the admission of Colorado into the Union a large number of Utes had, under treaty rights, been located upon a narrow strip of arid land bordering on New Mexico for the avowed purpose of enabling them to become self-supporting and civilized as an agricultural people, but no direct mention was made of necessary irrigation water.

The Ute allotment agreement of 1880.—On June 15, 1880 (21 Stat. 199), Congress accepted and ratified an agreement with the Southern Utes to settle upon unoccupied agricultural lands in their reservation bordering on New Mexico. The allotments were to be made in severalty to the head of each family giving each 160 acres with additional guaranty of grazing lands not exceeding 160 acres and single persons were to be allotted 80 acres and an additional 80 acres of grazing land.

(*c*) Executive orders—

EXECUTIVE ORDER ESTABLISHING THE SOUTHERN UTE RESERVATION

EXECUTIVE MANSION, *February 7, 1879.*

It is hereby ordered that the following-described tract of country in the State of Colorado, to wit: Commencing at the intersection of the thirty-seventh parallel of north latitude with the one hundred and seventh degree of west longitude thence east along said parallel to the ridge described in Hayden's Geographical and Geological Survey of said State as the "National Divide" of the San Juan Mountains; thence following said divide in a general northerly and northwesterly direction to longitude 107° and 23′ west; thence due south to latitude 37° and 17′ north; thence due east to the one hundred and seventh meridian of west longitude; thence south with said meridian to the place of beginning, be, and the same is hereby, withdrawn from sale and settlement and set apart as a reservation for the Nuache, Capots, and Weeminuchee Bands of Ute Indians.

R. B. HAYES.

Modification of allotment agreement, 1883.—Under act of March 15, 1883 (22 Stat. 449), the Ute Commission under the allotment agreement of 1880 was abolished and it was further provided that in lieu of a money payment, stock may be given to the Indians.

EXECUTIVE ORDER

EXECUTIVE MANSION, *August 4, 1882.*

It is hereby ordered that the following-described tract of country in Colorado, viz: Commencing at the northeast corner of the present Ute Indian Reservation, as defined in the treaty of March 2, 1868 (Stat. L., vol. 15, p. 619); and thence running north on the one hundred and seventh degree of longitude to the first standard parallel north; thence west on said first standard parallel to the boundary

line between Colorado and Utah; thence south with said boundary to the northwest corner of the Ute Indian Reservation; thence east with the north boundary of the said reservation to the place of beginning, withdrawn from sale and set apart for the use of the several tribes of Ute Indians by Executive order dated November 22, 1875, be, and the same is hereby, restored to the public domain.

It is hereby further ordered that the foregoing-described tract of country in Colorado, viz: Commencing at the intersection of the twenty-seventh parallel of north latitude with the one hundred and seventh degree of west longitude; thence east along said parallel to the ridge described in Hayden's Geographical and Geological Survey of said State at the "National Divide" of the San Juan Mountains; thence following said divide in a general northerly and northwesterly direction to longitude 107 and 23′ west; thence due south to latitude 27 and 17′ north; thence due east to the one hundredth and seventh meridian of west longitude; thence south with said meridian to the place of beginning, withdrawn from sale and settlement and set apart as a reservation for the Muache, Capote, and Weeminuchee Bands of Ute Indians by Executive order dated February 7, 1879, be, and the same is hereby, restored to the public domain.

CHESTER A. ARTHUR.

4. History.—The Southern Ute Reservation was established by the treaty which was approved by Congress September 9, 1850. (9 Stat. 948.) This reservation lies in the southwestern part of Colorado and the greater portion of the land is rough and suitable only for pasture. The only land suitable for agricultural purposes lies along the various streams within the reservation, the principal body of this land being along Pine River. The reservation was diminished by several Executive orders, the first of which was in 1879. Allotments were made to the Indians in 1898, and the reservation was opened for settlement in 1899, and the surplus lands taken up by white settlers. The Indians were a nomadic people of the Ute Tribe and were accustomed to live principally by means of hunting and fishing. The record of the first irrigation work shows that there were several small ditches constructed in 1884 and 1885. About 1895 water filings were made with the State engineer, covering the estimated amount of water required to irrigate the various Indian lands. These filings were contested in many cases by the white landowners, and in 1901 a suit was filed requesting adjudication in the courts of these claims. This suit is still pending, and it is contemplated that the case will be tried some time within the near future.

Owing to the fact that a considerable portion of the land along these streams was homesteaded by whites who had built ditches to irrigate their land, it was necessary to enter into numerous agreements with them to irrigate the Indian lands in the most economical manner. In one case it was found advisable to purchase from these whites a ditch they had constructed. In 1913, $1,500 was paid to the owners in the Doctor Morrison Canal, in order to obtain the water supply for Indian lands. The Indian Service started its program of construction and operation and maintenance of the various systems in 1909, and the various ditches were constructed as money was appropriated by Congress. The superintendent has leased all the lands that the Indians were unable to farm for which he could secure leases. These lessees were required to pay an annual assessment for operation and maintenance. These assessments partially covered the cost of operating the ditches to supply this land. No charge was made against Indian farmed land for operation and maintenance, nor was any assessment fixed by the Secretary of the Interior covering assessments against white-owned land. Some collections, however, were made by the irrigation officials from white owners based on the actual per acre cost of operation and maintenance.

5. LOCATION, TRANSPORTATION, AND MARKETS

State: Colorado.
County: La Plata.
Townships: 32, 33, 34 north.
Ranges: 7, 8, allotted lands; also 2, 3, 4, 5, 9, 10, 11, 12, 13 west of New Mexico principal meridian.
Longitude: 107–38.
Latitude: 37–08.
Railroads: Denver & Rio Grande Western, about 25 miles through allotted lands.
Highways and roads: Old Spanish trails; U. S. Colorado No. 450 passes east and west through Bayfield, Durango, Mancos, a short distance above old reserva-

tion line. About 6 miles of this graveled Bayfield to Durango and most of it Durango to Mancos, 30 miles. Balance are dirt roads estimated at 120 miles-graded to some extent. Within the project there are about 50 miles, all dirt roads, partly graded.

Cities and towns (estimated population): In project: Ignacio, 300; La Boca, 15. Near project: Bayfield, 200; Tiffany, 25; Allison, 50; Arboles, 30; Oxford, 25; Durango, 5,000; Hesperus, 50.

Railroad stations: All of the above except Bayfield; also Pine River and La Posta.

Markets: Largely local, except shipments of livestock and potatoes to the eastern markets.

6. RESERVATION LANDS AND ALLOTMENTS

(*a*) *Area of individual and tribal lands.*—Area of reservation as originally established, 1868, 24,420 square miles; area of reservation at present, 512,000 acres.

(*b*) *Allotments.*—Allotments were made 1895 to 1898 along the streams, and the western portion of the reservation was cut off as Diminished Southern Ute Reservation. Lands not allowed were opened for settlement. The roll was closed and the last allotment made March 12, 1898.

All individuals were allotted 160 acres, heads of families 320 acres, wife not receiving any separate allotment. Each allotment was classed as half agricultural and half grazing with little reference to character of land.

Total number of allotments 375. Total number of persons, including wives of heads of families, 436. Total acreage, 72,970.

Number and classification of allotments:

Classification:	Total area, Acres
Irrigated agricultural	6, 470
Irrigable agricultural	12, 500
Grazing	[1] 52, 000
Timber	[1] 2, 000
Total (375 allotments)	72, 970

Two hundred and thirty-nine allotments, aggregating 46,400 acres, are now held under trust patent. No allotments are held by Indians in fee. Twenty allotments, covering 3,670 acres, have been sold for $21,448.76, at an average price of $5.85. Of this total acreage of 3,670 acres, 600 acres were classed as irrigable and 400 additional as irrigable subject to reimbursement. Appraised and sale values were $2 to $18 per acre.

Practically all who were allotted and sold their allotments purchased other allotted land or have inherited interests. All sales, whether of dead or living allottees, were made by the Government for the Indians, except in the case of one or two where the allotment was inherited by a non-Indian.

Sales of allotments to other Indians are not considered in the foregoing statements.

7. POPULATION AND INDIAN HEALTH CONDITIONS

Ute Indian Tribe

	1910	1920	1925	1927
Indians	362	334	361	368
Indian births	11	6	15	13
Indian deaths	8	13	9	4
Whites (estimated)	150	400	500	500
Total population in towns (estimated)	50	200	300	315

Indians having tuberculosis	1
Indians having trachoma	70
Indians living in permanent homes	368
Full-blood Indians	330
Less than full blood	38
Indians receiving rations	None.

[1] Estimated.

8. CLIMATE

Period covered by reliable records: 1913 to date.
Range in elevation of irrigable area: 6,000 to 6,800.
Maximum temperature: 95° F.; minimum temperature, 35° F. (1926, −14). Average maximum temperature, 72°; average minimum temperature, 19°; mean annual temperature, 44.9°.
Average annual precipitation: 15.89 inches.
Average annual rainfall (estimated): 12 inches.
Estimated annual snow: 30 inches, equal to 4 inches of rainfall.
Average date last killing frost, spring: May 15.
Average date first killing frost, fall: September 6.
Average growing season: 180 days.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(*a*) *Topography.*—Topographic survey was made of land under the Doctor Morrison system for design of the lateral system. Other smaller sections have also been covered.
Average slope of irrigable areas: Estimated W. 10.
Maximum slope of irrigable areas: Estimated about 1 in 3. This rocky hillside for pasture.
Minimum slope of irrigable areas: Estimated 0.03.
Probably 50 per cent of the land is of fairly uniform slope, the balance more uneven with rocky hillsides on the edges of the mesas more or less parallel with the general direction of the river. All has more or less ridges and depressions so that several small laterals are necessary to reach all land on most farms.
Per acre cost of clearing, plowing, leveling, and ditching smoothest lands of irrigable area: $10; roughest, $15; average, $12.
(*b*) *Soil.*—No soil survey has been made.

	Estimated acreage	Depth	Subsoil	Native vegetation
River bottom, black, sandy	1,800	1 to 3	Gravel and rock	Sagebrush, natural grass, cottonwoods, brush, etc.
Rocky hillside	2,000	Soil and rock mixed	Gravel	Pinions and cedars, sagebrush, grass, etc.
Red loam, somewhat sandy	7,000	5 to 10	Hard clay, etc	Some pinions; sagebrush.
Red sandy loam	4,500	10 to 20	Gravel and rock	Sagebrush.
Adobe	2,500	5 to 15	Hard clay	Do.

There is some seepage along several sections of sidehills and an appreciable amount in Dry Creek Valley, where alkali salts are evident; smaller areas are affected in Spring Creek Valley and the river bottoms; most of such lands has never been cropped, except possibly 10 acres in the town of Ignacio. Possibly 1,200 acres are seepy, with 800 of them alkali.
There has been practically no drainage except a small amount of shallow open ditch in the town of Ignacio.
(*c*) *Irrigation methods and water delivery.*—Most of the irrigation here is done by continuous-flow method, customary in Colorado, with some modifications according to demand, and with some rotation at very low stages of supply. The head varies according to acreage served, but is usually one-fourth to 1 second-foot.
(*d*) *Duty of water.*—While there is no complete seasonal record of deliveries, the average duty of water is about 3 acre-feet per acre. On river-bottom lands first benches with gravel subsoil close where irrigated intensively, it probably reaches 5 acre feet; there are perhaps 1,000 acres with such a duty. Probably 2 acre-feet would be a minimum for lands systematically irrigated.

(e) *Average crop production*

	Area, 1926	Mean average yield	Average range of price
	Acres		
Alfalfa	2,867	2.3 tons	$5 to $8 per ton.
Oats	265	1,000 pounds	$1.50 per 100 pounds.
Native hay	110	1.5 tons	$8 per ton.
Wheat	1,165	1,500 pounds	$1.75 per 100 pounds.
Pasture irrigated	1,600		$3 per acre.
Garden	102		$35 per acre.

10. WATER SUPPLY AND WATER RIGHTS

(a) *Source.*—The source of water supply of the main project is the Pine River. The elevation of the drainage basin is from 7,000 to 11,000 feet; area about 450 square miles.

Maximum run-off, estimated, 520,000 acre-feet per year.

Minimum run-off, estimated, 150,000 acre-feet per year.

Mean run-off, estimated, 530,000 acre-feet per year.

Discharge at critical point: Maximum, estimated, 6,000 cubic feet per second; minimum, estimated, 0.1 cubic foot per second; mean, estimated, 45 cubic feet per second.

No storage.

(b) *Project diversions*

	1924	1925	1926
Acre-feet for season	18,000	20,000	21,000
Acres irrigated	6,250	6,500	6,500
Acre-feet per acre	2	3	+3
Average second-feet:			
April	10	10	10
May	50	50	50
June	100	100	100
July	60	70	80
August	40	60	70
September	30	30	30
October	20	20	20

(c) *Water supply and water rights.*—Allotted lands in the Pine River Valley have been provided with various ditches diverting water from Pine River, said ditches requiring an ultimate diversion of 212 second-feet from Pine River for the irrigation of 16,886 acres of land.

The filings on water from Pine River include:

	Construction	Filing	Acres	Second-feet	Capacity claimed
Agency ditch	1870		60	0.75	1
Buckskin ditch	1884	August 1902	200	2.50	8
Severo ditch	1884	do	334	4.25	4
La Boca ditch	1884	do	940	12.00	12
Nanice ditch	1884	do	40	.50	2
Ceanaboo ditch	1885	do	795	10.00	20
Spring Creek ditch	1895	January 1896	7,243	90.50	192
West Side ditch	1895	do	2,570	32.25	81
Watts Grant ditch	1900		300	4.00	4
Commissioner ditch	1901	August 1902	738	9.24	9
Moore ditch	1903		70	1.00	1
Doctor Morrison ditch	1899	1905	3,596	45.00	
Dale ditch	[1] 1895		80	1.00	

[1] Changed to Dry Creek, 1899.

Suit for adjudication of water rights from Pine River was started in the district court about 1901 and statements of claims were filed for these various ditches, the Doctor Morrison Ditch being then owned by other parties. Action on this suit was suspended, but it is subject to being called up at any time. The irrigation service bought 45 second-feet from Doctor Morrison, or all his rights to water for the Doctor Morrison Canal.

On August 13, 1924, suit was started by the Department of Justice of the United States to quiet title to prior rights for these ditches enumerated, by filing in the District Court of the United States for the District of Colorado of a bill of complaint against the Morrison Consolidated Ditch Co. et al., defendants; being suit in equity No. 7736.

Most of the defendants were served shortly thereafter. Several conferences have been held between Hon. Ethelbert Ward, special assistant to the Attorney General, and attorneys of the defendant ditch companies and further action may be taken shortly.

From the Piedra River there are several small ditches constructed years ago for small tracts, practically all of which have been sold. The United States owns a $\frac{1}{10}$ interest in the Alamo ditch covering about 300 acres of allotted land, part of which has been sold. This river has a large flow and little chance for diversion so no question of rights is probable. The Alamo ditch was filed in 1900 for 10 second-feet.

From the San Juan the United States constructed the San Juan ditch about 1900 with a capacity of about 10 second-feet. Present use is about 4 second-feet for 200 acres. There is little probability of question of water rights here.

From the Animas River the Animas ditch was constructed and filed January and April, 1902. This ditch has been enlarged by white settlers who maintain it under contract without cost to the United States. Decree in the Animas-Florida adjudication gave prior rights to Indian owners of allotted lands unsold at that time, 1920, for 5½ second-feet.

From the La Plata about 5 second-feet are diverted for land still held by Indians, through the Rabbit and Johnson ditches. These diversions are not included in court adjudication decree. Water rights on this river are further covered by the Colorado-New Mexico La Plata River compact.

All claims and use are for natural flow. There is no storage on any of these streams by the United States or whites except a small amount in Emerald Lake which was used in 1918 to provide water for domestic use and a little more from the Pine River.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

(*a*) *General plan.*—This project consists of a system of comparatively small ditches, which system has been growing for 50 years or more. Costs of construction up to July, 1910, are not available; any costs given are subsequent to that date.

The Spring Creek ditch constructed in 1895 was taken over by the Spring Creek Extension Ditch Co. and the predecessor of the Pine River Canal Co. under contract to maintain constructed capacity of 40 second-feet for water used by Indians without charge. The enlargement consisted of upper 4½ miles.

A comprehensive lateral system to reach all allotted lands under this diversion was made in 1910 to 1913. This includes all allotted land east of the river actually irrigable therefrom except that under a few small old ditches. This system is practically completed. Some additional turnout will be necessary and also some checks, etc., on small laterals. It will be necessary to enlarge the main canal for capacity required above 40 second-feet.

On the west side of the river the Doctor Morrison ditch was purchased 1913 for $15,000, capacity for 12 second-feet being reserved. This was enlarged to total capacity of 60 second-feet and extended to cover some 1,800 acres not otherwise provided for. This involved construction of several large flumes, concrete headgate and spillway and a very complete lateral system. It will be necessary to construct one flume and build 4 miles of ditch to cover 360 acres not yet irrigable therefrom at a cost of about $4,500.

Construction costs given for other (older) ditches are nominal, as original costs are not available and most of the work has been charged as maintenance.

(b) Divisions or units of project.—

Ditch	Irrigable acres		Construction cost, present	Per acre cost	Additional required to complete
	Proposed	Present			
Spring Creek system	7,243	7,243	$62,489.17	$8.63	$9,000.00
Doctor Morrison system	3,596	3,239	118,796.73	36.68	6,000.00
West Side ditch	2,570	2,570	5,619.74	2.19	3,000.00
Ceanaboo	795	795	2,872.10	3.61	3,000.00
Commissioner	738	738	1,340.37	1.82	1,000.00
Severo	334	334	635.93	1.90	1,000.00
La Boca	940	591	3,414.75	5.78	2,000.00
Watts-Grant	300	300	99.49	.33	1,000.00
Agency	60	60	200.40	3.34	
Buckskin	200	200	10.90	.05	
Nannice	40	40	5.45	.14	
Moore	70	70	27.65	.40	
Dale	80	80	6.55	.08	
San Juan		[1] 200	24.20	.12	
Alamo		[1] 300	1,964.28	6.55	1,000.00
Animas		[1] 400	261.30	.65	
Rabbit		[1] 200	1,310.35	6.55	
Johnson		[1] 100			
Warren Vosburgh			83.92		

[1] Estimated.

Doctor Morrison Ditch.—Purchased 1913 for $15,000 including all claims dating to 1899, from Ignacio, Mesa Ditch & Reservoir Co., and Dr. S. W. Morrison, with reservation right to carry 12 second-feet of water conditioned on payment of cost of maintenance and with no recognition of status of right of reserved water.

	Miles
Total length purchased and enlarged	10.0
Extension, new	2.1
Total	12.1
Proposed extension not yet built	5.4

Ten laterals with branches to reach all tracts of land.

Total length of laterals and branches (capacity 1 to 20 second-feet, 24 miles.

Principal structures: Reinforced concrete headgate; reinforced concrete spillway; 4 metal flumes 34 to 108, total length; 1 metal flume drop No. 42, with concrete stilling box 300 feet, drop 100 feet.

On extension: Three metal flumes No. 60 to 84, 2,000 feet. Small concrete turnout. Paved drop.

Laterals, to west, K to N, partly not used, have concrete checks for excess fall. Checks not all placed in B to G, are mostly rock. These have also timber division box turnouts.

Lateral K is used in common with part of owners of 12 second-feet reserved water and two other parties use portions for carriage of water from other sources to their land. This was used prior to purchase by the United States. Agreement should be executed.

Acreage irrigable with proposed extension	3,539
Acreage irrigable present construction	3,239
Total construction cost to June 30, 1927	$118,796.73
Per acre construction cost to June 30, 1927	$36.68

(Not including headquarters, etc., 1927.)

Operation and maintenance costs June 30, 1919, to June 30, 1925, averaged for the six years $0.585 per acre per year, that for 12 second-feet reserved being $38.10 per second-feet per year.

Of the eight owners of reserved 12 second-feet one has paid all assessments. three have paid a large portion, three a small portion, and one has paid none.

Spring Creek system.—Spring Creek ditch filed by agent January, 1896, for 192 second-feet, 6.88 miles long. This was enlarged by Spring Creek Extension Ditch Co. and Colorado Development & Ditch Co. (now Pine River Canal Co.), about 1901–1903, for 2¾ miles. By a 3-party agreement with the United States by John B. Harper, March, 1906, these companies agree to maintain a recognized constructed capacity of 40 second-feet. This was to be without charge while

used by Indians. Non-Indian users by leased sale were to pay proprotionate cost to point of diversion. Pine River Canal Co. enlarged about 1¾ miles farther and apply terms of agreement for such distance. Beyond this point they are carrying Indian water (some 10 second-feet at present) to laterals of our system and individual turnouts at a nominal charge of $4 per second-foot per year for such additional carriage for Indian and actual cost to each point of diversion for non-Indian.

Laterals of this system were constructed 1910 to 1915 as follows:

Ute Creek lateral, 1910, 3.6 miles, 15 second-feet; since extended about 2 miles, 6 second-feet. Has concrete headgate, short metal flumes, cement pipe turnouts and culvert. Since shortly after construction, owners of 120 acres near end of main portion of ditch with water right representing 1½ second-feet in Pine River Canal, have used this for carriage from Pine River Canal to their land. An agreement was proposed a few years ago but death of one of the owners has delayed action. They have assisted in maintenance work.

Spring Creek lateral, 1910–1912, 43 second-feet; total length, 9.5 miles plus 1.7 miles extension. Upper 4 miles is enlargement of portion of existing West Side Lateral of Spring Creek extension ditch from 20 to 63 second-feet capacity. They now carry about 28 second-feet. This has concrete heading in Pine River Canal (two 5-foot gates), 1 metal flume (2 have been repaired by putting ditch in earth); small concrete lateral turnouts, 2 having pipe drops and 14 concrete drops (6 to 7 foot drop) for excess grade at lower end, with rock checks for same purpose on extension. This Spring Creek lateral has seven branch laterals of 2 to 10 second-feet capacity, totaling 11 miles.

Julien lateral, 2.5 miles, 8 second-feet. Head about one-half mile below Spring Creek lateral.

Cloud lateral (originally upper portion of East Side lateral for which a new heading was placed below because of a washing-out of a short flume), 0.7 miles, 4½ second-feet. Head about 4 miles below Spring Creek lateral.

East Side lateral, 3 miles, 10 second-feet along each side lands allotted in Spring Creek Valley. Head about 4½ miles below Spring Creek lateral.

There are individual headings from the original Spring Creek ditch for allotted lands along the river along its upper portion, and from Pine River Canal for allotments near the head of Spring Creek Valley, where laterals have not been required.

Total number main laterals, 5; total length, 24 miles.

Total number branch laterals, 11; total length, 31 miles.

Total acreage system, 7,243.

Total required capacity, 90½ second-feet.

Total filed capacity, 192.

Total construction capacity, 40 (recognized by contract).

Total additional required capacity, 50½ second-feet.

Construction cost to June 30, 1927, $62,489.17 (since 1909).

Per acre cost, $8.63.

Acreage irrigated (estimated), 1,600.

Acreage irrigated Pine River Canal (estimated), 9,000; irrigable estimate, 12,000.

Acreage irrigated Spring Creek Extension D (estimated), 3,500; irrigable estimate, 4,500.

Operation and maintenance costs averaged for six years to June 30, 1925, $0.457 per acre per year.

West Side ditch.—Filed for United States December, 1895, for 81 second-feet.

Acreage irrigable, 2,570; capacity required, 32¼ second-feet.

Present capacity (estimated), 25 second-feet.

Total length about 8 miles.

Two laterals totaling 6 miles.

Construction has consisted of betterments. Work charged mostly to operation and maintenance.

Flume across Dry Creek replaced by new structure 1918.

Flume across Brink's draw was replaced by concrete wall 1926.

Brush and rock checks placed in some sections cut deep because of excess grade. Lateral 2 being portion of original lateral below Dry Creek was put in shape and extended, and a heading put in Dry Creek.

Flood of June, 1927, closed side channel at head and cut to bluff about one-half mile below head, cutting out a section of ditch. It is being supplied through the Dr. Morrison Ditch and this will probably have to be made a permanent arrangement.

Total acreage irrigable, 2,570 acres.
Total acreage irrigated (estimated), 1,250 acres.
Total construction cost to June 30, 1927, $5,619.74 (since 1909).
Total per acre construction cost, $2.19.
Operation and maintenance costs averaged for six years ending June 30, 1925, $0.689 per acre per year.

Ceanaboo ditch.—Most northerly ditch on east side of river, being above Spring Creek ditch. Filing and court records of 1902 show construction in 1885 for 20 second-feet.

Acreage irrigable, 795, requiring 10 second-feet.
Acreage irrigated, estimated, 350.
Length, 2½ miles; capacity, 10 second-feet.
Has 2 laterals, 2½ miles.
Construction cost to June 30, 1927, $2,872.10 since 1909.
Construction cost per acre, $3.61.
Construction cost covers principally a new lateral on flatter grade to cover additional land (2 miles).

The flood of June, 1927, again washed out a section of this ditch where repaired some nine years ago after similar damage. It will probably be advisable to enlarge the Bean ditch (white) about 1½ miles and extend it one-half mile as a new heading.

Operation and maintenance costs for six years ending June 30, 1927, averaged $1.221 per acre per year.

Commissioner ditch.—Constructed and filed 1901, as of length of 4.8 miles; capacity, 9 second-feet.

Acreage irrigable, 738 acres, requiring 9.24 second-feet (present capacity).

Because of difficulty and expense of maintenance of upper 1½ miles of this ditch, a new heading was placed in Beaver Creek with three-fourths mile of new ditch to connect with old, about 1913. In 1924 a new concrete headgate with concrete dam across Beaver Creek was constructed.

Present length from Beaver Creek heading, 5.1 miles.
No laterals but a one-fourth mile extension to take unused flow to Severo ditch.
Acreage actually irrigated, 450.
Total construction cost to June 30, 1927, $1,340.31 since 1909 (not including headquarters, etc., 1927).
Per acre construction cost to June 30, 1927, $1.82.
Operation and maintenance costs averaged for six years to June 30, 1925, $1.22 per acre per year.

Severo ditch.—Filed in 1902 as being constructed in 1884 for 4 second-feet with length of 2.2 miles; 334 acres irrigable, requiring a capacity of 4.25 second-feet, which it has.

The present timber headgate will require replacement shortly. There is one flume across Ute Creek which was replaced in 1925, at which time several bends in the creek were cut across to straighten the channel under the flume. While the Spring Creek system and Commissioner ditch can supply the land under this ditch, it appears advisable to retain this heading because of additional return flow available at this point during times of shortage.

Acreage irrigated (estimated), 250.
Total construction cost to June 30, 1927 (since 1909), $635.93.
Per acre construction cost to June 30, 1927, $1.90.
The operation and maintenance costs for 6 years to June 30, 1925 averaged $1.57 per acre per year.

La Boca ditch.—Evidence filed in 1902 in court records, claims construction in 1884 of capacity of 12 second-feet and length 2.8 miles; 940 acres irrigable, requiring 12 second-feet. This acreage includes 349 acres of allotments sold to parties who constructed an enlargement of upper 1¼ miles and extension of 7 miles from that point on flatter grade to cover their lands. This was done in 1911 to 1913. They filed an enlargement for 12 second-feet about 1924. They have assisted in maintenance of enlarged portion except for proportion of cost of replacement of two flumes thereon. An agreement should be executed covering this situation, present owner being Hersch Mercantile Co. of Pagosa Spring, who have signified willingness to make such agreement.

While this ditch is on the west side of Pine River, it covers land entirely separated topographically from the Dr. Morrison and West Side and must be maintained as a separate unit.

All flumes on this ditch, 7 in number, including the 2 on enlarged section, have been replaced by new structures during the past 4 years. The control gate at the head will need to be replaced as soon as possible. The area actually

irrigated is estimated to be 550 acres, including 250 acres of owners of extension. Total construction cost to June 30, 1927, $3,414.75 since 1909. Per acre construction cost to June 30, 1927, $5.78. Operation and maintenance costs have averaged for 6 years to June 30, 1925, $1.79 per acre per year.

Watts-Grant ditch.—This has also been called the Watts-Hatcher or Hatcher ditch. No filing has been made. The evidence shows it was constructed in 1900 with a capacity of 4 second-feet. Its present length is about 2¼ miles.

This ditch, like the La Boca, is used by the Nersh Mercantile Co., owners of sold allotted land, who extended it and have assisted in maintenance, except for the replacement of an upper flume thereon in 1926.

It will probably be advisable eventually to make this ditch a lateral from the La Boca, but it will be best to maintain the present heading at least until settlement of the pending water suit.

Total construction cost to June 30, 1927, $99.49 (since 1909).

Per-acre construction cost to June 30, 1927, $0.33.

Acreage irrigable (estimated), 300.

Acreage irrigated (estimated), 120 (including 60 acres of Nersh Mercantile Co.).

Operation and maintenance costs paid by the United States from 1922 to 1927, six years, average about 40 cents per acre per year, being mostly during the past two years.

Agency ditch.—Waters part of agency reserve east of river; no filing. Evidence shows construction about 1870; capacity 1 second-foot. Present actual capacity about 3 second-feet. Irrigable acreage about 60 acres, requiring three-fourths second-foot. Length about three-fourths mile.

Actually irrigated, 60 acres.

Construction costs to June 30, 1927, $200.40; $3.34 per acre, since 1909.

These costs have not been collected as title to the land is still in the United States.

Operation and maintenance costs for seven years to June 30, 1926, averaged $1.93 per acre per year.

At low stages of the river, this has been supplied through the Commissioner ditch. It may be necessary to make this arrangement permanent because of damage from floods of June and September, 1927.

Buckskin ditch.—This supplies land of Chas. Buck (Ute) irrigable also from Spring Creek system. Filing in 1902 claims cosntruction in 1884 with capacity of 8 second-feet length 0.28 mile.

Irrigable acreage, 200 acres, requiring 2.5 second-feet.

Acreage irrigated (estimated) 60 acres.

Construction costs are only nominal, total to June 30, 1927, since 1909, being $10.90; $0.05 per acre.

Operation and maintenance costs, none. Ditch being kept up by the Indian.

Mannice ditch.—Filing in 1902 claims construction in 1884 with capacity of 2 second-feet and length of 0.28 mile.

Irrigable acreage 40 acres, requiring 0.5 second-feet.

Land is also irrigable from west Side ditch.

This may have to be abandoned because of deepening of river channel.

Total construction costs to June 30, 1927, $5.45.

Per acre construction costs to June 30, 1927, $0.14.

Total operation and maintenance costs to June 30, 1927, $11.75—before June 30, 1920.

Acreage irrigated (estimated), 10 acres.

Moore ditch.—This has no filing. Evidence shows construction in 1903 with capacity of 1 second-foot. Length is about three-fourths mile.

Total construction cost to June 30, 1927, since 1909, $27.65. Per acre construction cost to June 30, 1927, $0.40.

Operation and maintenance costs to June 30, 1927 about $9.20; per acre, $0.13.

Balance of operation and maintenance has been by Indians and lessees, directly.

Dale ditch.—No filing. Evidence shows it was constructed about 1895 from Pine River to irrigate land on allotment of John Dale, and in 1899 was changed to divert water from Dry Creek. Length, about one-half mile. Capacity, 1 second-foot.

Area irrigable (estimated), 80 acres.

Area irrigated (estimated), 30 acres.

Total construction cost cinse 1909 to June 30, 1927, $6.55; per acre, $0.05.

Operation and maintenance costs, none.

Has been maintained by the Indian and lessees, directly.

San Juan ditch.—From the San Juan River, about 20 miles east of Pine River; 30 miles from Ignacio.

Filed in 1900 for 33 second-feet and length of 5.8 miles.

Constructed with a capacity of 10 second-feet; length 3½ miles.

At present it has a capacity of about 6 second-feet and a maintained length of 1½ miles.

Acreage irrigable (estimated), 200 acres, requiring 2.5 second-feet.

Acreage irrigated (estimated), 100 acres.

Total construction costs since 1909 to June 30, 1927, $24.20; per acre, $0.12.

Operation and maintenance June 30, 1920 to June 30, 1927. Mostly during 1923, or an average of $1.26 per acre per year. Balance of maintenance has been by Indians, lessees, and owners of sold land, directly.

Alamo ditch.—United States right consists from Piedro River to 0.4 interest in ditch and water rights, etc., of the Alamo Ditch Co., purchased about 1908 for the sum of $4,000, and transferred by deed. The superintendent of the Southern Ute agency (now Consolidated Ute) has represented the Government interests at meetings of the company and has usually been a director.

This ditch was filed in 1899 and constructed about the same time with a capacity of 10 second-feet and a length of about 2¼ miles. Name of ditch and company was changed about this time from "Cottonwood Irrigating" to "Alamo." This service constructed an extension of 4 second-feet capacity 2¼ miles long, 1922 to 1925.

Acreage irrigable (estimated), 300 acres.

Acreage irrigated (estimated), 125 acres.

Acreage irrigable (lands of other stockholders), 0.6 interest (estimated), 300 acres.

Acreage irrigated (lands of other stockholders), 0.6 interest, etc., 160 acres.

Total construction costs, United States, to June 30, 1927, $1,964.28; per acre, $6.55.

Cost of interest in ditch not included.

Operation and maintenance costs January 1, 1922, to January 1, 1927, averaged $300.56 per year, or about $1 per acre per year.

Not all of the cost of maintenance of the main ditch is included. The main ditch is operated and maintained by the ditch company and four-tenths of the cost, less six-tenths of the cost incurred by this service is paid to them upon presentation of certified claims.

Animas ditch.—Filed 1902 as constructed 1902, diverting water from the Animas River for various Indian allotments as of a capacity of 32 second-feet and length of 5.5 miles.

Enlargements were filed and some of the allotments sold, and about 1905 an agreement was executed, giving these other parties right in the ditch for maintaining it free for the Indians. This is understood to be a year-to-year license revocable by the department. See report of H. F. Robinson, superintendent of irrigation, to the commissioner, of April 28, 1911.

It is the understanding that the decree of the district court in 1920 in adjudication of the waters of Animas and Florida Rivers (case 1751) gave first right to 5¼ second-feet for the unsold Indian allotted land under this ditch.

Acreage irrigable (estimated)	acres	400
Acreage irrigated (estimated)	do	150
Total construction cost since 1909 to June 30, 1927		$261.30
Per acre construction cost to June 30, 1927		.65

(This is for turnouts from main ditch.)

Operation and maintenance costs to June 30, 1927, 8 years, $32.25, an average of $4.03 per year, or 1 cent per acre per year.

Rabbit ditch, Johnson ditch.—These ditches divert water from the La Plata River. There were several ditches filed and constructed to irrigate allotted lands along the La Plata River dating back to 1896. Some had little construction done and those operating were badly damaged by flood of October, 1911. Surveys were made in 1911 and 1912 for two ditches to divert 5 second-feet total for the Rabbit and Johnson families. The latter was to be an enlargement of the Warren Vosburgh ditch (white). This was never constructed, but the Indians put in shape their old ditch covering another portion of their lands in the river bottom. Information was received at this time that in connection with the then pending suit to adjudicate water from the La Plata River, that an agreement had been reached that the Indian lands should be allowed 5 second-feet from the river.

A new Rabbit ditch was filed and constructed in 1912 with a capacity of 3 second-feet and 2.5 miles long. The upper portion of this ditch is an enlargement and revision of a small one supplying lands of the Fort Lewis School (State of Colorado, formerly military reserve, then United States Indian school) and Mrs. Annette Aspaas (now deceased).

There Indian (United States) rights are not included in the decree of adjudication. Diversions from the La Plata River are also now subject to the Colorado-New Mexico La Plata River compact, giving New Mexico one-half the flow at Hesperus (plus diversions above) during low stage in summer.

Rabbit ditch: Irrigable acreage, estimated, 200 acres; irrigated acreage, estimated, 90 acres.

Total construction cost to June 30, 1927	$1,310.35
Per acre construction cost to June 30, 1927	6.55

Operation and maintenance June 30, 1921, to June 30, 1923 (none since), $13.27, or 7 cents per acre.

Balance of maintenance has been done by Indians and lessees.

Warren Vosburgh ditch.—Total construction costs (surveys) to June 30, 1927, $83.92.

Johnson ditch.—No construction charges; operation and maintenance work have been done by Indians.

Acreage arrigable, estimated, 100 acres.

Acreage irrigated, estimates, 25 acres.

(c) Present condition of project

Ultimate area of project as proposed	acres	18,366
Area that can now be irrigated	do	17,800
Area now actually irrigated	do	6,500
Total construction cost to date		$207,071.58
(The above includes total amount charged to project. The amount distributed to the various ditches is less, as there was a large amount of indistributed costs at the time this project was taken over by the Indian Service.)		
Per acre construction cost to date (using 17,000 acres)		$11.99
Estimated construction cost to complete		$27,000.00
Estimated per acre cost when completed		$10.84

The project is practically completed; the only work is betterments of old canals that were taken over by the irrigation service.

(d) Construction costs by divisions and by principal features, with estimated cost for completion

Doctor Morrison system:	
Arable acreage	3,596
Irrigable acreage	3,239
Construction cost to date	$118,796.73
Estimated cost to complete	$6,000.00
Per acre cost to date	$36.70
Estimated per acre cost when completed	$34.70
Spring Creek:	
Arable acreage	7,243
Irrigable acreage	7,243
Construction cost to date	$62,489.17
Estimated cost to complete	$9,000.00
Per acre cost to date	$8.53
Estimated per acre cost when completed	$9.90
West Side:	
Arable acreage	2,570
Irrigable acreage	2,570
Construction cost to date	$5,619.74
Estimated cost to complete	$3,000.00
Per acre cost to date	$2.14
Estimated per acre cost when completed	$3.50
Ceanaboo:	
Arable acreage	795
Irrigable acreage	795
Construction cost to date	$2,872.10
Estimated cost to complete	$3,000.00
Per acre cost to date	$3.62
Estimated per acre cost when completed	$7.50

Commissioner:	
Arable acreage	738
Irrigable acreage	738
Construction cost to date	$1,340.37
Estimated cost to complete	$1,000.00
Per acre cost to date	$1.61
Estimated per acre cost when completed	$3.20
Severo:	
Arable acreage	334
Irrigable acreage	334
Construction cost to date	$635.95
Estimated cost to complete	$1,000.00
Per acre cost to date	$1.90
Estimated per acre cost when completed	$4.90
La Boca ditch:	
Arable acreage	940
Irrigable acreage	591
Construction cost to date	$3,414.75
Estimated cost to complete	$2,000.00
Per acre cost to date	$5.78
Estimated per acre cost when completed	$5.76
Watts grant:	
Arable acreage	300
Irrigable acreage	300
Construction cost to date	$99.49
Estimated cost to complete	$1,000.00
Per acre cost to date	$0.33
Estimated per acre cost when completed	$3.66
Almo:	
Arable acreage	300
Irrigable acreage	300
Construction cost to date	$1,964.28
Estimated cost to complete	$1,000.00
Per acre cost to date	$6.67
Estimated per acre cost when completed	$9.90

The per acre cost of construction on the various small systems is small, ranging from $1 to $5 per acre.

Per acre value of land without irrigation	$5–$15
Per acre value of land when irrigated	20–55
Increased per acre value of irrigation	15–40

12. SUMMARY OF PROJECT WORKS

(*a*) *Storage.*—None.
(*b*) *Canals and drainage structures.*

	Number	Concrete, cubic yards	Lumber, feet board measure	Pipe, feet	Approximate cost
Concrete canal headgates	2	200			$6,000
Concrete canal spillway	1	70			1,800
Concrete lateral headgates	3	30			800
Concrete and pipe lateral headgates	13	15		550	1,800
Concrete and pipe farm turnouts	12	10		170	600
Pipe farm turnouts	20			200	300
Wood farm turnouts	50		8,000		1,200
Wood bridges and culverts	70		25,000		1,800
Flumes, steel, waterway	50			4,400	15,000

Canals:	Miles
Capacity over 100 second-feet	None.
Capacity 50 to 100 second-feet	8
Capacity 15 to 50 second-feet	43
Capacity less than 15 second-feet	39
Total	90

(*c*) *Diversions.*—Spring Creek system: Head section maintained by ditch companies. Timber headgate, 30 by 18 feet, 4 by 6 by 4 foot gates. Screw lift, handwheel, 2 only, operated usually. Concrete spillway, 1,200 feet below head. Sixteen by 10 feet, two, 8-foot gates, screw lift.

Dr. Morrison Ditch: Concrete headgate, 12 by 20 by 16 feet high, three 3.5 by 4 foot gates, screw lift. Concrete spillway, 1,500 feet below head. Two 5-foot gates. Three 5-foot overflow spillway gates.

Commissioner ditch: Concrete headgate and low dam across Beaver Creek.

Other ditches: Single timber headgates, most of them requiring replacements. All ditches require temporary brush and rock diversion dams at low water.

(*d*) *Drains.*—None.

(*e*) *Project telephone system.*—None.

(*f*) *Individual Indian ditches.*—None.

All old ditches now operating in the valley and all outside supplying allotted lands still owned by Indians are included in tabulation above. It is not known to what extent, if any, labor was done by the Indians and not paid for and what proportion was done with Government funds. It is believed, however, that the greater part was with such Government funds. Some $70,000 is charged as having been spent for this purpose before the irrigation division was given jurisdiction.

13. Area and utilization of irrigable lands

	1924	1925	1926
(*a*) Utilization of Government project lands:			
Entire project—			
Acreage arable	18,366	18,366	18,366
Acreage irrigable	17,800	17,800	17,800
Acreage irrigated	6,074	6,500	6,282
Acreage cultivated			6,282
Total crop value			$102,170
Average crop value (acre)			$22.68
Indians farming			85
Lessees farming			30
White owners farming	35	35	35
School and agency	189	203	207
(*b*) Utilization of land owned by Indians and not leased (Government project):			
Farmed by Indians—			
Acreage arable	16,026	16,026	16,026
Acreage irrigable	15,560	15,560	15,560
Acreage irrigated	3,050	3,137	2,971
Acreage cultivated			2,971
Families farming			85
Cultivated per family			35
Total crop value			$37,355
Crop value (acre)			$15.75
Crop value (family)			$439.50
(*c*) Utilization of land owned by Indians and leased (Government project):			
Lessees—			
Acreage irrigated	1,035	1,134	1,373
Acreage cultivated			1,373
Number of lessees			30
Total crop value			$26,655
Crop value (acre)			$24.84
(*d*) Utilization of land owned by whites:			
Farmed by white owners—			
Acreage arable	2,340	2,340	2,340
Acreage irrigable	2,240	2,240	2,240
Acreage irrigated	1,800	2,026	1,938
Acreage cultivated			1,938
Number of white owners	35	35	35
Total crop value			$38,160
Crop value (acre)			$27.47

14. Principal crops, crop yields and returns

Crop	Average yield per acre	Acreage	Average price per acre	Average value per acre	Total value
Indian farmers:					
Alfalfa	1.72 tons	1,540	$5.000	$8.77	$13,500.00
Garden		50		32.00	1,660.00
Hay, natural	1.47 tons	85	8.000	11.76	1,000.00
Oats	100 bushels	105	.013	13.00	1,365.00
Potatoes	13,000 pounds	50	.015	796.00	9,750.00
Wheat	1,250 pounds	495	.015	18.78	9,300.00
Pasture		600		3.00	1,800.00
Miscellaneous		46		17.82	820.00
		2,971		13.17	39,135.00
Lessees:					
Alfalfa	2 tons	475	5.000	10.00	4,750.00
Beets	8 tons	25	[1] 6.000	48.00	1,275.00
Corn	1,400 pounds	15	.020	28.00	420.00
Hay, natural	1.5 tons	15	8.000	12.00	184.00
Hay, other	1.6 tons	15	8.000	12.80	208.00
Oats	1,070 pounds	70	.013	13.92	975.00
Wheat	1,643 pounds	365	.015	24.65	9,000.00
Potatoes	14,667 pounds	15	.023⅓	348.00	5,225.00
Seed—Sweet clover	500 pounds	50	.070	35.00	1,750.00
Pasture		300		3.00	9,000.00
Miscellaneous		18		14.41	2,868.00
		1,373		20.07	27,555.00
White owners:					
Alfalfa	2.5 tons	840	5.000	12.50	10,500.00
Barley	2,100 pounds	20	.015	31.50	630.00
Corn	1,425 pounds	40	.020	28.50	1,140.00
Garden		30		36.00	1,080.00
Oats	1,200 pounds	85	.014	15.60	1,170.00
Potatoes	14,753 pounds	44	.020	351.00	15,435.00
Wheat	164 pounds	305	.015	24.55	7,500.00
Pasture		550		3.00	1,650.00
Miscellaneous		35		20.14	705.00
		1,938		20.54	39,810.00

[1] And tops.

15. Economic conditions among project farmers, Indians, 1926

Number of Indian farms	85
Indian families farming	85
Livestock:	
Horses	371
Cattle, beef	280
Cattle, dairy	20
Sheep and goats	620
Estimated value livestock per farm	$600
Equipment:	
Plows	56
Mowers	80
Automobiles	7
Estimated value equipment per farm	$200
Acreage farmed by Indians, including pasture	2,371
Acreage farmed per family	28
Average crop value per family	$439.50
Average crop value per acre	$15.75
Per acre construction assessment against Indians	None.
Per acre operation and maintenance assessment against Indians	None.
Acres Indian land leased:	
Irrigated	1,373
Not irrigated	2,600
Average rental per acre, irrigated	$3
Indians receiving payments from—	
Timber, agricultural leases	26
Grazing leases	7

Average per capita payments from—	
Agricultural leases (26 Indians)	$150
Grazing leases (7 Indians)	$25
Average total payments to Indians:	
From agricultural leases	$3, 915
From grazing leases	$176
Indian reimbursable indebtedness, exclusive of irrigation	$410. 74
Amount of tribal fund	$399, 869. 51

Source of tribal fund: Proceeds Southern Ute Reservation and other ceded lands.

16. PROJECT OPERATION AND MAINTENANCE

(*a*) *Organization.*—One assistant engineer in charge of project, salary $2,400, less $300 for quarters, fuel, and light.

One subforeman, performing duties of ditch rider, salary $1,320 less $180 for quarters, fuel, and light.

(*b*) *Annual expenses*

Cleaning	$4, 000
Brushing	500
Water delivery	800
Canal development	2, 000
Structure maintenance	1, 000
Repairing breaks	200

Total expenditures for the calendar year 1926, not including headquarters, etc., were:

For operation and maintenance	$13, 788. 39
For construction	1, 032. 36
	14, 820. 75

(*c*) *Comparison with neighboring projects*

	Doctor Morrison Ditch United States	Morrison Consolidated Ditch (Inc.)
Elevation	6,600 to 6,800 feet	6,600 to 6,800 feet.
Growing season	Apr. 15 to Oct. 1	Apr. 15 to Oct. 1.
Water supply	Pine River, west side	Pine River, west side.
Crops grown	Alfalfa, wheat, oats, etc	Alfalfa, wheat, oats, etc.
Per acre crop value (estimated)	$21	$27.
Quality of construction	Very good	Good.
Total construction cost	$118,796.73, including first system.	$70,000, estimated.
Annual per acre construction assessment	$1.83	None.
Annual per acre operation and maintenance assessment.	$0.585 cost	25–50, average 40 second-feet, estimated $0.50 per acre.
Area irrigable land	3,239 acres	4,500 acres, estimated.
Per cent of irrigable land cultivated	28	55.
Capacity or water sold	45	58.

Doctor Morrison system includes practically complete lateral system to reach all land. Morrison Consolidated includes only main ditch—about 15 miles. Users maintain own laterals necessary, including an extension of 8 to 10 miles. Carries 55 to 70 s. f.

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(*a*) *Construction cost to June 30, 1927*

Ditches and features:	
Doctor Morrison system	$118, 887. 58
Spring Creek system	62, 499. 96
West Side ditch	5, 623. 94
Ceanaboo ditch	2, 873. 49
Commissioner ditch	1, 341. 76
Severe ditch	636. 37
La Boca ditch	3, 415. 45

Ditches and features—Continued.	
Agency ditch	$200. 40
Alamo ditch	2, 002. 83
Watts-Hatcher grant	99. 60
Animas ditch	261. 30
Warren Vosburgh ditch	83. 92
Rabbit ditch	1, 310. 35
San Juan ditch	24. 20
Jicarilla-Apache ditch	25. 50
Buckskin ditch	10. 90
Nannice ditch	5. 45
Dale ditch	6. 55
Moore ditch	27. 65
San Juan School drain	21. 80
Allan Cayon allotted lands	465. 10
Allotment surveys	69. 40

(*b*) *Collection of construction cost.*—Collections are being made wherever possible from white owners. See act of February 14, 1920 (41 Stat. 408). Collections were begun in 1920 from white owners and lessees. No collections were made from Indians as they do not have funds to pay. No penalties are charged on delinquent assessments.

Total construction assessments to date		$66, 478. 95
Total construction collections to date from:		
White owners	$498. 42	
Indians	-------	
Lessees	-------	
Total construction collections to date		498. 42
Total construction delinquencies to date		65, 980. 53

	Assessments made to date	Per acre annual construction assessment	Total collection to date	Delinquent
Doctor Morrison system	$41, 177. 32	$1. 85	$253. 11	$40, 924. 21
Spring Creek system	21, 358. 60	. 44	174. 88	21, 183. 72
West Side ditch	1, 484. 96	. 11	4. 95	1, 480. 03
Ceanaboo ditch	954. 98	. 20	----------	964. 98
Commissioner ditch	434. 60	. 10	6. 75	427. 85
Severo ditch	194. 79	. 10	----------	194. 79
La Boca ditch	873. 68	. 30	58. 73	814. 95
	66, 478. 95	----------	----------	65, 980. 53

(*c*) *Operation and maintenance cost to June 30, 1927*

Ditches and features:	Cost
Doctor Morrison system	$19, 990. 43
Spring Creek system	26, 989. 14
West Side ditch	16, 101. 54
Ceanaboo ditch	6, 864. 19
Commissioner ditch	6, 902. 51
Severo ditch	5, 236. 22
La Boca ditch	7, 398. 45
Alamo ditch	1, 724. 80
Miscellaneous small units	1, 245. 42
Total	92, 450. 70

(*d*) *Operation and maintenance collections to June 30, 1927.*—The acreage under constructed works is used as the basis for computing the annual per-acre operation and maintenance assessment. These assessments are made for the year when the land is leased, and are due before water is turned on. Refusal of water is used to enforce collections, which are made from white owners and lessees. Assessments for operation and maintenance are fixed in the lease contracts and the

only collections made are on the basis of 75 cents per acre per annum. Except in a few cases, collections have been arbitrarily made from white owners on estimated cost of operation and maintenance. No penalties are charged on delinquent assessments.

Total operation and maintenance assessments to date		$7,441.15
Total operation and maintenance collections:		
From Indians	None.	
From white owners	$1,760.29	
From lessees	2,964.94	
Total operation and maintenance collections to date		4,725.23
Total operation and maintenance delinquencies to date		2,715.92

	Operation and maintenance cost to date	Assessments to date [1]	Collections to date	Delinquent
Doctor Morrison system	$19,990.43	$3,829.50	$1,672.56	$2,156.94
Spring Creek system	26,989.14	1,343.24	975.99	367.25
West Side ditch	16,101.54	902.78	849.98	52.80
Ceanaboo ditch	6,864.19	261.93	222.00	39.93
Commissioner ditch	6,902.51	270.30	221.30	49.00
Severo ditch	5,236.22	20.00	20.00	
La Boca ditch	7,398.45	514.65	514.65	
Alamo ditch	1,724.80	298.75	248.75	50.00
	91,207.28	7,441.15	4,725.23	2,715.92
Miscellaneous small units	1,243.42			
	92,450.70			

[1] Made without issuance of public notice by Secretary of the Interior fixing the rates.

18. DISCUSSION OF PROJECT PROBLEMS

The Pine River project of the Southern Ute Reservation consists in the main of a number of small canals taking their supply of water from Pine River. Most of these canals, as will be seen from the detailed description of each, was started and mainly constructed prior to the organization of the Indian irrigation branch of the Indian Bureau in 1909. The earlier work was done by or under the direction of the superintendent of the agency, and no details were left as to the expenditures as between different systems. It is therefore impossible to obtain accurate figures as to the construction costs on any certain canal. Some of the expenditure represents operation and maintenance, while certain other ditches were largely built, maintained, and operated by the Indians interested. The construction cost on all is very nominal except upon the Doctor Morrison Ditch.

The entire project consists of a possible irrigable area of 18,336 acres, of which 2,340 acres or 12.7 per cent are in white ownership. All except about 500 acres can now be served with water.

A little more than one-third of the total is now being irrigated. The project is so situated that it will not advance to a high degree of development, even though it should largely pass to white ownership, due to its elevation of 6,000 feet and above, the poor transportation facilities over a long line of narrow-gage railroad, dependence on a local market for the sale of the bulk of its produce, with little or no prospect of that market expanding. The topography is rough and rolling, giving the project the appearance of being badly cut up and segregated into numerous small tracts.

Because of the limited market conditions for local products and other conditions, the project is better suited to be used in connection with stock or sheep raising. One-eighth of the land in the project is now in white ownership, and white owners farm 53 per cent of the acreage actually cultivated.

Extent of Indian farming.—The reports of the project show an Indian population of 368, with 85 families actually farming. This would indicate that nearly every Indian family was engaged in tilling the soil, with a total of 2,371 acres cultivated by the Indians, or 28 acres per family of those farming. It can hardly be expected that any rapid increase will be made in the acreage that will be farmed

by Indians under their present donditions of civilization. The average income of each Indian family in 1926 was $439.50 from farming operations, or about $100 per capita, if we assume that all Indian families are engaged in farming. From this earning it would be impossible for the Indian to meet his share of the operation and maintenance charges and also a construction charge.

There is a larger per cent of Indians farming on this reservation than any of the others that were inspected. There is very little opportunity for other means of employment other than farming. This probably accounts for the better showing of Indian farming on this project as compared with some other projects. When the adjacent community furnishes the opportunity for the Indian to labor, farming by them is at low ebb. Little or no consideration seems to have been given this feature of the situation in carrying out these projects. There is no escaping the conclusion that most of the larger Indian projects are being developed more in the interest of whites than for the Indians, and the pressure for such development, comes largely from the former. The Indian has been used to a considerable extent in obtaining development in his name and supposedly for his benefit, that had led to taking up and pressing for development of projects or units of projects along unsound lines, and some that are not economically fit for development to the extent that they are planned or undertaken.

Topography.—The project is located in a rough, rolling foothill country. The irrigable area of the project presents a very scattered appearance, badly cut up with rapid change from one class of soil to another. The slopes of the irrigable area are rather steep. No soil surveys have been made nor the irrigable land classified. Because of its roughness and being badly cut up a considerable mileage of canals is required to serve the limited acreage in the project.

If the project is to be completed and the remaining 65 per cent of the project lands now uncultivated are to be brought under irrigation, a soil survey and classification of the lands should be made in order to give a definite basis for working out the project. The irrigable area of the project now being used is considered little more than an approximation, and as so often happens in such cases, is very apt to be considerably less than the figures now used.

Joint use of certain irrigation works.—Some of the Government canals have been enlarged by other ditch companies and in the case of the Doctor Morrison Canal, an interest was retained for the carrying of a certain amount of water through the purchased canal, which is properly covered by contracts. We found, however, that certain canals were being used by private parties without apparent written agreement. Private structures have been placed across canals or upon the right of way without being covered by some form of written agreement. It is fully realized that such structures as bridges, flumes, etc., are necessary in the development of an irrigated section, nor should lands be unnecessarily burdened with or cut up with several canals where one will answer, but a complete record should be kept of such transactions by contracts which define the rights and responsibility of each of the contracting parties. On this project at the present time several of these instances brought to our attention are verbal understandings between the individual and the then project manager. Now that the project manager has been transferred to another section of the country there is nothing to guide the next manager except the word of the individual. It is too well known that such conditions are but the first steps to saddling the responsibility of the upkeep of such structures on the Government.

Water rights and irrigation conditions.—The project is served by a number of rather small canals, most of which were originally taken out by the Indians under the supervision of the Indian agents of the reservation. These canals were taken out from time to time. The Agency Ditch dates back to 1870. In order to protect the water rights of these ditches, the Indian Agent made filing for a number of them in compliance with State requirements. The development by the Indians has been slow, although here there was found a larger per cent of Indians attempting to farm than on any other project visited.

The whites also began as early as 1877 to divert water for irrigation, and with the opening of the unallotted lands of the reservation in 1899, the diversions from the stream soon began to consume its normal flows.

In 1901 an adjudication suit was filed in the State courts to determine the rights of the several owners of the water rights on the stream based upon the priority of use. Action on this suit was suspended, so that all rights are as yet undetermined. As the United States Government is the guardian of the Indians' water rights, such a suit in the State courts could have only settled the rights as between individual white appropriators and not between the whites and the Indians.

In August, 1924, the Department of Justice brought suit in the United States district court at Denver, Col., to quiet title to the prior rights claimed for these Indian ditches. The Government is its suit claims a prior right to the use of 212 second-feet of the direct flow of Pine River and one additional second-feet from Dry Creek. This claim is not based upon the actual use of water to the land, but upon principles that were established by the Winters decision in the Milk River case.

The reclamation of the Indian lands has progressed very slowly. In his report of August 9, 1906, the superintendent of the agency stated "Up to the present time these people have not advanced very rapidly in agricultural pursuits. Quite a number of them, but not a large percentage, have small patches of land in cultivation and raise some oats and wheat, though most of their farming consists of putting up hay, both wild and alfalfa."

In his report of July 23, 1908, the superintendent of the agency stated: "Irrigation is now beginning to trouble these Indians. They are realizing that water systems are necessary and are continually asking for water to be placed on their allotments." The records in 1927 show about 6,500 acres under the project canals being cultivated and irrigated by Indians and whites or 35 per cent of the estimated irrigable acreage.

The white settlers along the stream outside of the Indian reservation put these unused waters to a beneficial use within a few years after the reservation lands were thrown open to settlement.

The defendants in the above case claim that they were encouraged by the Government throwing these lands open to settlement under the public land laws to settle on these lands and begin their reclamation by the construction of ditches from the Pine River or its tributaries; that the Government knew these lands were arid and unfit for farming without irrigation; that this development was made with the Government's knowledge; that if the Government's contention in this suit is upheld, that many of the defendants will be ruined financially. The defendants claim the Government owes them an obligation no less weighty than its obligation to the Indians. At the time the rights of these defendants were initiated the settlers as well as the Government were working on the theory that the actual application of water to a beneficial use was the controlling element in establishing a water right. They began and prosecuted their development in good faith. It was not until several years later that the Winters decision was handed down which threw a new light on the priority of use of water for Indian lands on reservations under Government control.

At the present time the Indians of this reservation are farming about all the land they can be expected to farm for a number of years to come, with still 65 per cent of the project to reclaim. The Government must face one of two things, either to leave the project in the state it is in to-day, 35 per cent reclaimed; or to bring the balance of the land under cultivation by selling or leasing the lands to whites. In the former case a large part of the Government's investment will be tied up as a frozen asset, and to operate and maintain it will either add to the investment or make the cost of the same a heavy charge upon the smaller acreage of the project as it is to-day. In the latter case, to force these lands under cultivation would enable the Government to recover at least in part its investment and lighten the burden of operation and maintenance. If, however, this is to be done by enforcing the principles laid down in the Winters decision it can not be denied that the practical effect of the same would be to build up a tract of about 12,000 acres for white farmers at the sacrifice of other whites who have enjoyed the use of these waters for many years. The gain for the Indian will be the unearned increment which he may get out of rental or increased land value.

The construction charges on Indian lands should become a lien upon the land, but no charges should accrue against the land so long as the same is held under trust patent or remains in Indian ownership. All leased Indian lands should conform to the general recommendations made in this report. Public notice should issue covering the lands subject to a partial construction charge as soon as the necessary data for the same can be obtained.

Public notices under the act of February 14, 1920, should be issued for each project, making specific the amounts per acre that are to be collected under each unit. Heretofore a general public notice assessing a certain per cent of the construction cost has been made. Your advisers have had difficulty in ascertaining the construction cost on most projects. In one case three separate construction costs were given us from the same office, which varied by more than 30 per cent.

Construction costs to the amount of $498.42 have thus far been collected. All assessments that have heretofore accrued on white-owned lands or on leased

lands in compliance with instructions, should be collected, or water refused after delinquency of one year.

The accruals against Indian lands should be eliminated, as the Indian can not pay them and they are a hindrance in case of sale. It is not that the Government will lose the amount, but the collection of the same will be made after the land is sold or through the returns of leasing. The accruals of $66,478.95 means very little because it is largely against Indian lands.

Operation and maintenance.—Operation and maintenance costs to June 30, 1927, amount to $92,450.70. No public notices have been issued prior to the above date assessing any part of the operation and maintenance costs against any of the lands of the project. Some collections have been made on the basis of actual cost, in part on contracts. The total collections amount to $4,725.23. The records of the project show $2,715.92 due from different sources. The collections and amounts due are small as compared with the cost.

The present operation and maintenance costs are running at the rate of $12,000 to $13,000 per annum, or 75 cents per acre, if distributed over the entire acreage under constructed works. With only 35 per cent of the project under irrigation and about all the area that can be expected to be cultivated under present economic conditions, 65 per cent of the costs would accrue against unproducing lands, or about $8,500 per annum.

Under ordinary conditions the uncultivated lands should bear their share of maintaining and operating the system from and after the time that the project works can deliver water; that, however, must be coupled with the ability to provide the water. In this case a grave question exists as to the ability of the Government to provide an ample supply for the acreage now in a raw state until the question of the water rights for the project are settled either by providing for a supplemental supply or a court decree to prevent diversions on the upper part of the stream. Until that is accomplished it would be unjust to assess the lands to which water can not be supplied.

The Government must on the other hand look to the placing of the operation and maintenance of these projects upon a self-supporting basis. The operation and maintenance costs up to date are of such an amount that it would be assuming too much of a burden to increase the operation and maintenance rates, so that this amount ($87,725.47) would be absorbed by the present active acreage. We believe that the interests of the project could be best served by transferring these charges to the construction accounts.

If the operation and maintenance account is cleared by such transfer to the construction costs, the future conduct of the project should provide for the meeting of all operation and maintenance costs by the active acreage, under the conditions as they exist on this project.

Operation and maintenance public notices should be issued providing a rate that will suffice to meet annual costs based upon the actively cultivated acreage.

There is no reason why public notice should not have been issued some time ago, so that the white owners would pay what the service to them was costing the Government.

We are of the opinion that this land should be brought under cultivation in order that the Government may recover a portion of its investment and to lighten the operation and maintenance costs of the project. However, we are unable to see where it would be equitable to force other lands out of cultivation that have been enjoying the use of these waters for many years. It is our understanding that a comparatively small storage reservoir to tide over a rather short low-water period would accomplish this result, and especially so with the character of crops now being produced. We also are advised that it is possible to develop such a reservoir. While legally the defendants in the case above referred to may have no standing in court, yet morally and in equity we feel their case should receive serious consideration, and to that end we are making recommendations looking toward certain stipulations in the case, involving the Government constructing a reservoir of limited capacity. Such action is not without precedent, as Congress has in the case of the Wapato project on the Yakima Reservation in Washington appropriated funds for the purchase of reservoir water for Indian lands, instead of forcing the early white settlers to give up the waters they put to beneficial use, which under the principles laid down by the Winters decision should have been available for the Indian lands.

Similar cases have arisen on the Walker River, in Nevada, and the Gila River, in Arizona, where the same problem is under consideration.

Construction costs.—The present construction cost to June 30, 1927, amounts to $206,911.40, all of which has been distributed to the different features of the construction. In addition to the above, an item of $73,647.29 is carried as

undistributed. The major portion of this was from the appropriations for "Irrigation, Indian reservations," prior to 1909. As the Doctor Morrison Canal was not purchased until 1913 no Government funds from the above source went into that system. The most or all of the other systems were under construction before 1909; it would therefore appear that this amount should be distributed to the acreage under the remaining canals in order to comply with the law of August 1, 1914.

The acreage that is now susceptible of irrigation amounts to 17,800 acres, of which 3,239 acres are under the Doctor Morrison Canal.

The above acreages are subject to correction by a soil survey and land classification. They will, however, suffice for the establishing of construction charges until more definite data is secured. Construction collections should be made on these lands on the basis of 2½ per cent of the construction cost, provided said annual assessment shall not exceed $1.25 per acre and shall not be less than 50 cents per acre.

Irrigation on Northern Cheyenne Reservation, Mont.

RECOMMENDATIONS

(1) As the Tongue River project of the Northern Cheyenne Reservation is a total failure, having been abandoned because of the impracticability of maintaining the main canal, and because of nonfertility of soil due to alkali, it is recommended that its entire cost, including $73,109.62 constituting a gratuity converted into a reimbursable charge by the act of August 1, 1914 (as included in Appendix B, hearings of the Committee on Indian Affairs, House of Representatives, 66th Cong., 1st sess., act of June 30, 1919), and all other sums expended for irrigation on the Tongue River project that now may be carried as a reimbursable charge, be charged off, and be no longer considered a just and equitable charge against the land included in the project, or against the Indians.

(2) Because of failure to achieve beneficial results, it is recommended that the cost of all other irrigation work heretofore done on the Northern Cheyenne Reservation be not considered as a reimbursable charge against either the land or the Indians of the reservation.

(3) It is recommended that the property, including some construction equipment formerly used on the project, since it is not deemed of sufficient value to justify transfer, be turned over to the superintendent of the reservation for such use as he may be able to make of it.

LOCATION AND GENERAL DESCRIPTION

The Northern Cheyenne, sometimes called the Tongue River Reservation, was established by Executive order of November 26, 1884. The boundaries were later modified and more definitely described by Executive order of March 19, 1900. The Indians are of the Northern Band of the Cheyenne Tribe and number about 1,500. They were formerly buffalo-eating Indians and lived in the western part of Nebraska and South Dakota, and in southeastern Montana. In 1876 the Government moved them to a reservation near Fort Reno, Calif., but after about two years they ran away and returned to their former hunting grounds, over which they roamed until their present reservation was established.

This reservation is just east of the Crow Reservation in southeastern Montana, and its eastern boundary is the Tongue River, a tributary of the Yellowstone River. The reservation is about 34 miles long in an east-west direction, and about 22 miles in width from north to south. The area is 489,500 acres.

The Indian agency, school, and hospital are located at Lame Deer, which is about 55 miles east of Crow Agency. Supplies are ordinarily freighted in from Forsythe, Mont., the nearest railway point on the Northern Pacific, and the St. Paul Railroads. Forsythe is about 40 miles north of the northern boundary of the reservation.

TOPOGRAPHY

With but few exceptions the land of this reservation is rough and hilly and suited only for grazing purposes. About 70,000 acres of the more elevated land is timbered with pine of fair quality, though the trees are not large. There is an abundance of soft coal. About 3,000 acres of gently rolling plateau land on the divide between Lame Deer and Busby is devoted to dry farming with fair success. Some land near Birney is also dry farmed.

Allotments have not been made on this reservation, but the Indians are anxious that the land be allotted and there is an item of $52,000 in the appropriation bill for 1929 which will be immediately available for carrying on the work of classification, surveying, and allotting these lands.

The only land possible of irrigation on the reservation is a narrow strip of bottom land aggregating about 6,000 acres along Tongue River, and a few isolated tracts along small streams or creeks within the reservation, principally on Lame Deer and Rosebud Creeks. Aside from Tongue River the water supply is very limited.

IRRIGATION DEVELOPMENT

Irrigation work by the Government on this reservation has included the construction of the Tongue River project, which has since been abandoned, and some assistance given in improving a few of the individual Indian ditches on Lame Deer and Rosebud Creeks.

ADEQUATE SURVEYS AND INVESTIGATIONS WOULD HAVE CONDEMNED THE PROJECT

The Tongue River project seems to have been attended with misfortune from the start. The greatest mistake in connection with it was that it was ever begun. It is simply another case of where a project was initiated in advance of the thorough and searching investigation necessary to ascertain its feasibility. Had a soil survey been made, it would have been condemned. However, as was usual in the early days of irrigation (1905), no soil survey was made.

The Tongue River, flowing in a northeasterly direction, is the eastern boundary of the Northern Cheyenne Reservation. The Tongue River project (now abandoned) therefore included the land lying only on the west side of the river.

ADVERSE CONDITIONS MAKE PROJECT INFEASIBLE

The belt of bottom land along Tongue River is quite narrow, seldom more than a mile in width, and for the most part is inclosed on either side by steep slopes or perpendicular rock or shale cliffs. Winding about through this narrow valley and flowing at the base of the cliffs and hills first on one side and then on the other of the valley, the river cuts the land into comparatively small tracts of varying size, lying between its successive bends. Thus the bottom land on either side of the river, in general, consists of a succession of tracts lying between the river and the hills, and separated from each other by varying distances wherein the river flows along the base of the hills on the same side of the valley. The stream moreover is not confined to a permanent channel, but is continually shifting about.

Such conditions made canal construction almost impossible, as much of the work involved deep excavation along steep rocky hills, while flumes were necessary to convey the water along the cliffs where excavation was impossible or prohibitive in cost.

To add to the difficulties, numerous creeks and arroyos, or coulees, all of which at times are subject to high floods, enter the valley from the hills on either side, and these have to be crossed by the canal, either by means of flumes or other structures, difficult and expensive, both to construct and to operate and maintain.

Moreover, much of the land is but little above the river and is subject to overflow, especially during the spring run-off when ice jams frequently occur. Practically all of the land is also subject to floods from the creeks or arroyos that drain the surrounding hills.

Adding to the foregoing difficulties and adverse conditions, the fact that the project is isolated—about 70 miles from the nearest railway station—with a road impassable much of the time, it will be seen that it would be difficult to find a more forbidding or unpromising place to build an irrigation project.

While, as indicated by the early reports, these difficulties seem to have been recognized, they were not fully appreciated, and what afterwards developed to be the greatest obstacle of all to the success of the project, namely, the fact that the land is heavily impregnated with alkali, which condition rapidly became worse under irrigation, was overlooked entirely. As was usual in the early days of land reclamation, a soil survey was not made, but it was apparently assumed, as stated in the preliminary report of the then chief irrigation engineer, W. H. Code, "the land is rich and productive."

In view of the numerous adverse conditions referred to in the foregoing, the result was about what might have been expected.

ESTIMATED COST OF PROJECT

As pointed out in the preliminary reports of 1905 and 1906, topographic conditions made it necessary in order to get water to the land, to place the canal heading 2 feet about the river bed and to restrict the grade of the canal to 1 foot per mile, when as a matter of fact it should have been 3 feet per mile. Much difficult and expensive rock work was encountered in construction. On the canal as first proposed, 11 miles in length, there were 12 flumes aggregating 6,153 feet. The estimated cost was $51,098.

GREAT DIFFICULTIES ENCOUNTERED IN CONSTRUCTION

Misfortune attended the work from the start. Work on the main canal was begun in the spring of 1907. During the summer of 1907, while the work was in progress, three unusually high floods destroyed parts of the canal and several of the structures. During the spring of 1908, an unprecedented flood caused by ice jams in Tongue River overtopped and partially destroyed the canal head gate, and several canal structures, including some of the flumes, and the canal. As a result, it was found necessary upon rebuilding the canal, to increase the height and cross section of the lower bank by 50 per cent over the original plans, and to place heavy riprap on the outer bank as protection against the river floods.

About 6.8 miles of the canal, serving an area of 1,300 acres, was finally completed in the summer of 1909. The Indians immediately began the cropping and the irrigation of some land they had already cleared near the upper end of the valley. One estimate places the area irrigated in 1910 at 500 acres; another at 700 acres; 500 is probably more nearly correct.

DIFFICULTIES OF OPERATION AND MAINTENANCE

Continual trouble was experienced in getting water through the canal and in consequence the water service was precarious and unsatisfactory. Frequently when water was needed, it was not available. In addition to other difficulties incident to floods, there were frequent failures of certain sections of the canal as the result of excessive seepage and resultant land slides.

Shortly after irrigation was started, the alkali made its appearance, and by 1911, after only two seasons of irrigation, it was reported (November 6, 1911), that an area adjacent to the canal and about one-fourth mile in length, was badly affected, and in fact ruined by alkali, which was ascribed to seepage from the canal. It is said that this condition rapidly spread and that within the next year or two, many Indians had to give up and abandon their little farms. This land was never allotted to the Indians, but they were given tentative selections.

Again in 1913 (March 5), it is reported there was a big flood in Tongue River, higher than at any previous time since the construction of the project. This overtopped the canal heading, partially destroyed the headgate and several other canal structures, filled up the canal in some places, and washed great holes in it at other places.

ABANDONMENT OF THE PROJECT

After this, some repairs were made, and attempts were made with varying success to serve water through the upper part of the canal for the next few years. By 1918, a considerable part of the canal had been abandoned and but few of the Indians were trying to farm; the operation and maintenance was transferred from the irrigation division to the superintendent of the reservation. It is said that some water was served through the upper part of the canal up to and including part of the season of 1920, since which time no attempt has been made to use it.

PRESENT CONDITION OF PROJECT

As a result of our inspection of this project in August, 1927, and an investigation of all the facts and circumstances in connection with it, including a hearing with the Indians and their tribal council, the advisers are unanimous in the conclusion that any attempt to rehabilitate this project would be a greater folly and a more inexcusable mistake than its original construction.

The headgate is in a precarious condition; all of the flumes and culverts are practically destroyed; the canal in many places is practically obliterated, being filled in with earth and débris from the numerous arroyos, while in other places it is broken through and eroded to great depths. Much of the land is white with alkali, and in many places the ground water plane is at or near the surface. Drainage of the land would be impossible because of insufficient slope and subsoil conditions.

COST OF PROJECT

In the records of the Indian Office, the costs of irrigation activities on this reservation, including the Tongue River project, are given as follows:

Construction costs	$132, 817. 50
Operation and maintenance costs	29, 410. 92
Total investment of United States	162, 228. 42

It is shown in Appendix B, Gratuities converted into reimbursables by the act of August 1, 1914 (hearings before the Committee on Indian Affairs, House of Representatives, 66th Cong., 1st sess., on the condition of various tribes of Indians, act of June 30, 1919), that $73,109.62 of the above total investment of the United States was expended from the appropriation "Irrigation, Indian reservations," from 1884 to June 30, 1914, same having been made reimbursable by the act of August 1, 1914.

So far as can be gleaned from the reports and records available, a considerable part of the above total expenditure for irrigation is from the fund "Indian moneys, proceeds of labor." It is also considered quite probable by the advisers, as stated by some of the Indians and certain agency employees and former employees, that some moneys appropriated or authorized at various times for irrigation work was in fact expended for other purposes not directly connected with irrigation, such as road building, etc.

As the maximum acreage ever claimed to have been provided with irrigation facilities on the Tongue River project is 1,300, it will be seen that the above expenditure amounts to about $125 per acre. It is apparent, considering the isolation of this project, that nothing like this amount could ever be repaid by our best white farmers, even though the project were a successful one.

INDIANS OPPOSE REHABILITATION OF PROJECT

The Indian tribal council, in a hearing held with them at Lame Deer, Mont., on August 4, 1927, voted unanimously that they wanted the Tongue River project permanently abandoned, for the reasons that it is impossible to maintain the canal, and the ground is full of alkali.

In conclusion, it is the unanimous verdict of your advisers that the Indians of this reservation have received no permanent or substantial benefits from the Government's expenditures for irrigation and that in consequence no part of these expenditures should be considered as a reimbursable charge against either the tribe of individual Indians.

Irrigation on Uintah Reservation, Utah

1. RECOMMENDATIONS

It is recommended:

1. That there be made an accurate determination of the productive irrigable acreage on this project for which there is an adequate water supply.

2. That after making the soil survey and classification involved in recommendation No. 1, all construction assessments and all unpaid operation and maintenance assessments against unproductive and worthless lands infeasible of reclamation by drainage, be written off.

3. That all Indian allotments now held by Indians by trust or fee patents, such allotments being unproductive and worthless, shall be canceled and the Indians given allotments of irrigable productive land.

4. That, as the land included in the so-called White River allotments is heavily impregnated with alkali, and moreover the irrigation development would be difficult and excessively expensive, these allotments be canceled, and irrigable productive lands within the existing Uintah project, or under private canals be purchased for these Indians and allotted to them.

5. That, in cases where there is comparatively only a small acreage of Indian land within a unit of the irrigation system, practically all land having gone into white ownership, efforts be made to relocate the Indians with a view of turning such unit over to the white land owners for operation and maintenance.

6. That, in all cases of delinquency in construction or in operation and maintenance payments for a period of three years or more, legal action be brought for collection.

7. That, in all cases where land is now charged with construction and operation and maintenance assessments, but such land is without a water right due to

failure of project officials to include it in the water filings, such charges be written off, or steps be taken to provide a water supply by purchase and transfer.

8. That, as the failure of the Government to make operation and maintenance collections from the Dry Gulch Irrigation Co. for the past five years resulting in a delinquency now due from the company of about $45,000, is subjecting the Government to great criticism and making it difficult to make collections from other water users, legal action be brought to enforce collection of this indebtedness.

9. That legal action be brought against the Dry Gulch Co. to compel them to cease their activities in draining the lakes at the heads of streams supplying water to this project, and otherwise interfering with the project water supply.

10. That immediate steps be taken to adjust the claims of the Colorado Park Irrigation Co. which have been a matter of controversy for many years.

11. That steps should be taken to secure annual congressional appropriations sufficient to defray the operation and maintenance cost on irrigable Indian land not leased at the same rate per acre as is, on the average, charged against white owned and leased Indian land. This would require an appropriation of $20,000 annually.

2. SYNOPSIS

The Uintah Indian Reservation was established by Executive order of October 3, 1861. As originally established it included 3,186 square miles, or 2,039,040 acres, lying in the east central part of Utah, averaging approximately 40 miles in width, north and south, and 76 miles in length, east and west. The entire area of the reservation is broken by river canyons and foothills of the Wasatch and Uintah Mountain Ranges. Approximately 200,000 acres adjacent to the Duchesne, Uintah, and Green Rivers are suitable for irrigation. The remaining part of the reservation, approximately 1,800,000 acres, is suitable for grazing purposes only.

On July 4, 1905, the President issued a proclamation setting aside as an addition to the Uintah Forest reserve 1,010,000 acres, and by the same proclamation opened to entry the unreserved and unallotted lands, which amounted to about 1,000,000 acres.

Transportation and markets.—The Denver & Rio Grande Railroad is 80 miles west of the project in the Price River Valley. Between the Uintah Basin and the Price River Valley are the Wasatch Mountains. Railroad connection is by an automobile stage and freight line operating between Price, the nearest railroad point, and towns on the project. An elevation of 9,500 feet is reached in crossing the Wasatch Range, which makes transportation charges for bulky crops prohibitive.

The principal markets are Denver, Kansas City, and Salt Lake City. The latter also is reached by a truck line which operates during the summer months when snow is light on the mountains.

The Victory Highway connecting Salt Lake City and Denver passes through the reservation and is under construction.

Allotments.—On July 1, 1904, the Secretary of the Interior directed the Indian agent to allot the lands of this reservation. The work of allotting lands to the Indians of the reservation as provided by law, was completed and approved on July 18, 1905, the total area allotted aggregating approximately 103,265 acres. The total number of allotments was 1,390. Heads of families of the Uncompahgre Indians were alloted 160 acres farming and 160 acres grazing land; other than heads of families were allotted 80 acres farming and 80 acres grazing land. Heads of families of the Uintah and White River Indians were allotted 80 acres farming land and all others 40 acres of farming land. Grazing land for the Uintah and White River Indians was not allotted individually, but a grazing reserve was aside for them.

At present there are 1,045 allotments held by trust patents and 8 allotments held by fee patent. There have been sold 240 trust allotments of deceased allottees, and 46 allottees having received fee patents, have sold their allotments. Of these allottees, 13 are now landless.

Population and health conditions.—The Indians are of three tribes, viz: Uncompahgre, 423; Uintah, 499; and White River, 245; or a total of 1,167, in 1927. Of this number 1,003 are full-blood Indians and 164 are less than full-blood. The increase in population during the period 1920 to 1926, was 58. There is reported 10 cases of tuberculosis and 520 cases of trachoma. There are 188 Indian families living in permanent homes. The white population of the project in 1927 is estimated at 4,860.

Climate.—The range in altitude is 4,700 to 7,000 feet. Maximum temperature is 100°, minimum temperature, 24° below zero. The average length of the growing season is 130 days, and the average annual precipitation is 7.34 inches.

Soil and drainage.—A soil survey has been made on a small portion of the reservation but covers such a small acreage that it is really of no value to the project. The soil, in general, in the flat lands, is clay and sandy loam, ranging in depth from 1 to 10 feet, with dement gravel subsoil, and the soil on the benches and higher land is generally gravelly, with from 1 inch to 1 foot of sandy loam, and subsoil of coarse gravel. There is an area of approximately 5,000 acres affected by alkali along the Duchesne River.

Some attempt has been made at drainage but it has not proven successful, as the character of the subsoil is such that percolation, if any at all, is very slow. The drains attempted are not of sufficient depth to be of any value except for a very small area adjacent to the drain. Excavation for a drain in the subsoil which prevails on this project can not be done except by modern machinery, which was not available when the drains were constructed. The entire area above mentioned must have drainage before further cultivation is attempted.

Water supply and water rights.—The water supply is from the water sheds of the Duchesne, Lakefork, Uintah, and Whiterocks Rivers, which comprise an area of approximately 4,000 square miles, at an average elevation of 9,000 feet. No storage has been provided, and the supply depends entirely upon the snowfall during the winter months. The supply so far has been sufficient for all Indian project lands except for an occasional unusually dry year. The project lands have a primary water right in amount of 1 second-foot for seventh acres, maximum flow, and a total delivery of 3 acre-feet per season. Filings have been made with the State engineer of Utah, and certificates of proof of beneficial use have been issued.

General plan of irrigation development.—Topographic conditions, together with the demand of the Indians that they be allotted along the streams where they had formerly lived, made it necessary to construct a large number (22) separate canal systems to serve the Indian land.

The structures both in the main canals and laterals are of timber. Brush and rock dams and timber cribs filled with rock are used at all diversions. No permanent diversions have been built. The separate units were designed to irrigate 87,591 acres. Of the 22 units, three divert from the Lakefork River, four from the Whiterocks River, eight from the Duchesne, and seven from the Uintah River.

Summary of project works.—There are 3 canals, capacity 200 to 300 second-feet, total length 29 miles; 4 canals, capacity 100 to 200 second-feet, total length 29 miles; 4 canals, capacity 50 to 100 second-feet, total length 49 miles; and 533 miles of canals and laterals of a capacity of 5 to 50 second-feet. Total length of canals and laterals or projects, 640 miles. There are 4,900 wood structures and 4 metal structures.

Utilization of land.—During the season of 1927, of the area on which proof of beneficial use has been made (77,273 acres), 58,290 acres were irrigated, 45,319 acres were under crops, and 12,971 acres pastured, making 59 per cent cropped and 76 per cent irrigated. White owners irrigated 18,228 acres, lessees on Indian-owned land irrigated 24,819 acres, and Indians on Indian-owned land irrigated 15,243 acres.

There were farming on the project during the year 1927, Indians, 262; white owners, 350; and white lessees on Indian-owned land, 349.

Principal crops, yields, and returns.—The principal crops grown on the reservation during the calendar year 1927 by all ranchers were: 3,998 acres of wheat; 2,938 acres of oats; 898 acres of corn; 34,768 acres of alfalfa; 1,784 acres of clover. The average yield of wheat per acre was 20 bushels, at a unit price of 95 cents per bushel, or $19 per acre; oats, 30 bushels per acre, at 60 cents per bushel, or $18 per acre average value; corn, 35 bushels per acre, unit price $1, average value per acre $35; alfalfa, 3 tons per acre, unit price $8 per ton, average value per acre, $24; a portion of the acreage in fal alfalfa was not harvested for hay, but was kept for seed. This acreage was approximately 12,000 acres, at an average yield of 250 pounds per acre, unit price 13 cents per pound, or per acre value of $33.50.

There are quite a number of good farmers on the project, and there are a great many more who are very indifferent and depend entirely on alfalfa seed, which only makes a good yield every fourth or fifth year. Therefore, they are financially embarrassed a greater part of the time.

The estimated value of crops for the year 1927 was $1,055,687.

Construction costs.—To June 30, 1927, the total expenditures for construction of the various units was $901,894.04, or an average per acre cost of $10.20, ranging from $1.91 to $30.43, for the acreage covered by proof of beneficial use, which is considered the total of the project under constructed works.

Collection of construction costs.—To date of June 30, 1927, no bills for construction charges had been sent to water users. On November 15 bills were issued in accordance with instructions from the Indian Office at a rate fixed at 2½ per cent of the total cost, in amount of $859.76. In response to this issue $48.63 had been paid to date of December 31, 1927.

The advertisements under which land sales were made prior to May 1, 1920, carried a statement to the effect that a paid-up water right was transferred with the land. This led purchasers to believe that their land was not subject to construction charges at all, and not subject to any maintenance charges which had accrued and were unpaid prior to the date of purchase. An opinion of the Attorney General rendered on September 2, 1921, is that construction charges on land sold prior to May 1, 1920, or under advertisements which held out to the purchaser that a paid-up water right was transferred with each tract sold, can not be collected from the purchasers. In accordance with the decision of the Attorney General, bills for construction charges were not issued to those who acquired their land under above-mentioned advertisements, which accounts for the small amount of construction charges assessed land owners on November 15, 1927. It is the belief of a great many who have purchased their land subsequent to May 1, 1920, that they should not be compelled to pay construction charges if those who purchased prior to the same date be exempt. The opinion prevails among all land owners that eventually there will be some legislation enacted wiping out their indebtedness, which probably explains the collection of only $48.63 to date of December 31, 1927.

Operation-maintenance.—The cost of operation and maintenance to date of June 30, 1927, is $1,035,334.11. The greater part of the unpaid operation-maintenance charges covers land held in trust for the Indians. Indians have been required to make payments only on land which has been leased, and the remaining part is the unpaid charges on land sold under the advertisements mentioned under collection of construction cost.

The collections for the year 1927 were exceptionally good, that is, approximately 95 per cent of the bills issued to white owners were paid. The remaining 5 per cent which was not paid is covered by land which has become seeped and no attempt is being made to cultivate it. The cost of operation-maintenance for the year 1927 was $60,833.11.

Under instructions fixing the maintenance charges for the calendar year 1928, Indians who have received their fee patent are required to pay maintenance, the same as white owners. Indians whose land is held in trust will be delivered water only on instructions from the superintendent's office, which office has authority to direct delivery of water to any trust patent allotment if in its opinion the Indian is not able to make his payments.

Operation-maintenance assessments are made and collected in advance of the irrigation season. The amount to be collected is based on the actual amount expended for the previous year. On each unit of the project a separate account is kept, and the land under a unit is assessed its prorata share of maintaining and operating that particular unit, which naturally fixed a different maintenance-operation rate for each unit on the project. These rates range, for the irrigation season 1928, from 25 to 91 cents per acre.

Government investment.—The total expenditures on this project to date of June 30, 1927, which includes all disbursements, total $1,965,002.62. There has been collected from all sources $276,424.84, leaving a total investment of $1,688,577.78.

Project problems and complaints.—The Dry Gulch Irrigation Co. has, by right of enlargement, a capacity of 125 cubic feet of water per second in the Uintah Canal, 260 cubic feet in canal No. 1, capacity to serve 1,500 acres in the Lakefork Canal, lateral No. 8, and by right of purchase is the owner of capacity to convey 23 cubic feet of water per second in the Bench Canal system. During the first years of this company's existence in the Government-constructed canals it did what work it thought necessary in maintaining and operating the canals of this project in which it had an interest, and the Government did the balance. At the end of each year the accounts were balanced and the necessary adjustments made, although the decree under which enlargements were made states specifically that this company should be responsible for repairs, rebuilding, and maintaining said canals in the ratio that the amount of said company's water flowing through said canal from year to year stands to the amount of water

flowing through said canals to irrigate project lands. In the year 1922 this arrangement of maintaining and operating the canals was discontinued, and the officials of this project assumed complete control of the entire system, as specified in the decree, and from that date on there has been a dispute as to what proportion of the maintaining and operating expenses of these canal systems this company should bear.

There have been numerous committee meetings between officials of this project and the company, and during the year 1925 a committee composed of Messrs. Engle and Irsfeld, representing the Uintah irrigation project, and Mr. Woolf, representing the Dry Gulch Irrigation Co., met in Washington and drew up what was thought to be an equitable agreement, but the stockholders of the company failed to ratify it.

The total amount assessed this company for the years 1922 to 1927, inclusive, is $54,294.48. Of this amount $10,037.61 has been paid, leaving an unpaid balance of $44,256.87.

Transfer of water.—A number of tracts of land on this project which have been purchased by white owners have become seeped and water-logged to such an extent that crops can not be grown, and the owners are making application to transfer the Indian water right from these tracts to homestead lands under the same canal system. In all cases these tracts are isolated and the acreage involved will not justify a drainage system; therefore it has been recommended that this matter be given consideration and if found practicable, the project engineer be given authority to make application to the State engineer for change of place of use. It is understood, of course, that all upnaid charges would have to be paid before the transfer would be permitted. By effecting these transfers, the project would immediately begin to derive benefits from collections of maintenance-operation assessment

Effect of storage on Indian water rights.—The Dry Gulch Irrigation Co. has made filings with the State engineer of Utah on paractically every lake lying in the watersheds of the Lakefork and Uintah Rivers. In most cases some construction work has been done in an attempt to secure an additional water supply for the company's lands, as their filings are secondary to the Indian filings and are not sufficient to meet the demands. This company does not propose to increase their supply of water by impounding a greater amount in these lakes, but by merely tapping the lake and draining off the natural storage. It would seem permissible for this company to increase the capacity of these lakes and use the additional amount impounded to supplement their supply, but it would hardly seem permissible to tap these lakes and lower the water level, which surely would have an effect on the late discharge of the rivers, of which these lakes would be considered the natural feeders.

This is a matter which has been the subject of several lengthy reports and which should be given consideration. Any work done or any amounts which have been drawn from these lakes so far has not affected the water supply for the Indian lands, but it is possible that in the future, when all Indian lands are irrigated, that this might be a matter of importance

3. DIGEST OF TREATIES, LEGISLATION AND EXECUTIVE ORDERS

(*a*) *Legislation.*—Act of June 15, 1880 (21 Stat. 300) was an act to ratify an agreement with the Confederated Bands of Ute Indians, which among other things provided for the removal of the White River Utes to the Uintah Reservation in Utah, and also made provisions for the allotment in severalty of said lands with stipulations as to the size and character of the allotments.

Act of May 24, 1888 (25 Stat. 157), was an act to restore to the public domain a part of the Uintah Reservation, and to provide for the disposal and sale of such restored lands on the condition that all moneys arising from such sale or disposal should belong to the Indians interested in said lands, and held or added to any trust funds of said Indians, at that time held in the Treasury of the United States.

Act of June 4, 1898 (30 Stat. 429) authorized and directed the President of the United States to appoint a commission to allot in severalty, on the Uintah Reservation, all Indians of the Uintah Reservation, and such Indians of the Uncompahgre Reservation as were unable to obtain allotments on the Uncompahgre Reservation. It also provided that the unallotted lands of the Uintah Reservation after all allotments had been made, would be ceded to the United States to be held in trust for the purpose of sale to citizens; *Provided*, That the amounts in aggregate, so received for such lands shall be sufficient to pay the Indians the full amount agreed upon, and shall be placed in the Treasury of the United States,

and be devoted to the use and benefit of the Indians having an interest in said lands.

Act of March 1, 1899 (30 Stat. 941): That the Secretary of the Interior be, and he is hereby, authorized in his discretion, to grant rights of way for the construction and maintenance of dams, ditches, and canals, on or through the Uintah Indian Reservation, in Utah, for the purpose of diverting and appropriating the waters of the streams in said reservation for useful purposes: *Provided*, That all such grants shall be subject at all times to the paramount rights of the Indians on said reservation to so much of the said waters as may have been appropriated, or may hereafter be appropriated or needed by them for agricultural and domestic purposes; and it shall be the duty of the Secretary of the Interior to prescribe such rules and regulations as he may deem necessary to secure to the Indians the quantity of water needed for their present and prospective wants, and to otherwise protect the rights and interests of the Indians and the Indian Service.

Act of May 27, 1902 (32 Stat. 263): That the Secretary of the Interior, with the consent thereto of the majority of the adult male Indians of the Uintah and White River Tribes of Ute Indians, to be ascertained as soon as practicable by an inspector, shall cause to be allotted to each head of a family 80 acres of agricultural land which can be irrigated and 40 acres of such land to each other member of said tribes, said allotments to be made prior to October 1, 1903, on which date all the unallotted lands within said reservation shall be restored to the public domain: *Provided*, That persons entering any of said land under the homestead law shall pay therefor at the rate of $1.25 per acre: *And provided further*, That nothing herein contained shall impair the rights of any mineral lease. * * *

Act of June 19, 1902 (32 Stat. 744): In addition to the allotments in severalty to the Uintah and White River Utes of the Uintah Indian Reservation in the State of Utah, the Secretary of the Interior shall, before any of said lands are opened to disposition under any public-land law, select and set apart for the use in common of the Indians of that reservation such an amount of nonirrigable grazing lands therein at one or more places as will subserve the reasonable requirements of said Indians for the grazing of livestock.

All allotments hereafter made to Uncompahgre Indians of lands in said Uintah Indian Reservation shall be confined to agricultural land which can be irrigated, and shall be on the basis of 80 acres to each head of a family and 40 acres to each other Indian, and no more. The grazing land selected and set apart as aforesaid in the Uintah Indian Reservation for the use in common of the Indians of that reservation shall be equally open to the use of all Uncompahgre Indians receiving allotments in said reservation of the reduced area here named.

Act of March 3, 1905 (33 Stat, 1070): That before the opening of the Uintah Indian Reservation the President is hereby authorized to set apart and reserve as an addition to the Uintah Forest Reserve, subject to the laws, rules, and regulations governing forest reserves, and subject to the mineral rights granted by the act of Congress of May 27, 1902, such portions of the lands within the Uintah Indian Reservation as he considers necessary, and he may also set apart and reserve any reservoir site or other lands necessary to conserve and protect the water supply for the Indians or for general agricultural development, and may confirm such rights to water thereon as have already accrued.

Act of June 21, 1906 (34 Stat. 375): For constructing irrigation systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes in Utah, the limit of cost of which is hereby fixed at $600,000, $125,000 of which shall be immediately available, the cost of said entire work to be reimbursed from the proceeds of the sale of the lands within the former Uintah Reservation: *Provided*, That such irrigation systems shall be constructed and completed and held and operated, and water therefor appropriated under the laws of the State of Utah, and the title thereto until otherwise provided by law shall be in the Secretary of the Interior in trust for the Indians, and he may sue and be sued in matters relating thereto: *And provided further*, That the ditches and canals of such irrigation systems may be used, extended, or enlarged for the purpose of conveying water by any person, association, or corporation under and upon compliance with the provisions of the laws of the State of Utah: *And provided further*, That when said irrigation systems are in successful operation the cost of operating same shall be equitably apportioned upon the lands irrigated, and, when the Indians have become self-supporting, to the annual charge shall be added an amount sufficient to pay back into the Treasury the cost of the work done in their behalf, within thirty years, suitable deduction being made for the amounts received from disposal of the lands within the former Uintah Reservation.

Act of March 1, 1907 (34 Stat. 1049): For constructing irrigation system to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, as provided by the act of June 21, 1906, $150,000.

Act of April 30, 1908 (35 Stat. 95): For constructing irrigation system to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, as provided by the act of June 21, 1906, $200,000.

That whenever it shall appear to the satisfaction of the Secretary of the Interior that the allotted lands of any Indian of the former Uintah and Uncompahgre Reservations in Utah are susceptible of irrigation and that the allottee is unable to cultivate the same or any portion thereof, such lands or such portion thereof may be leased by the Secretary of the Interior with the consent of the allottee for a period not exceeding 10 years, under such rules and regulations as he may establish.

Act of March 3, 1909 (35 Stat. 811): For constructing irrigation system to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, as provided by the act of June 21, 1906, $125,000, reimbursable. * * *

To enable the Commissioner of Indian Affairs to perfect and protect the rights of the Uncompahgre, Uintah, and White River Utes, in Utah, in and to the waters appropriated under the laws of the State of Utah for the irrigation systems authorized by the act of June 21, 1906, $200,000, or so much thereof as may be necessary, the amount expended hereunder to be reimbursed from the proceeds of the sale of lands within the former Uintah Reservation: *Provided*, That said sum, or any part thereof, shall be used only in the event of failure to procure from the State of Utah or its officers an extension of time in which to make final proof for waters appropriated for the benefit of the Indians, and any sum expended hereunder shall be reimbursed from the proceeds of the sale of the lands within the former Uintah Reservation.

Act of April 4, 1910 (36 Stat. 285): For straightening the Duchesne River within the limits of the town site of Duchesne, now Theodore, in the State of Utah, $5,000 to be immediately available, and to be reimbursed to the United States out of the proceeds of the sale of lands within the ceded Uintah Indian Reservation opened to entry under the act of May 27, 1902, including the sales of lots within said town site of Theodore.

That the Secretary of the Interior is hereby authorized to pay from the reclamation fund for the benefit of the Uintah Indians the sum of $1.25 per acre for the lands in the former Uintah Indian Reservation, in the State of Utah, which were set apart by the President for the reservoir and other purposes under the provisions of the act approved March 3, 1905, chapter 1479, and which were by the Secretary of the Interior withdrawn for irrigation works under the provisions of the reclamation act of June 17, 1902, in connection with the reservoir for the Strawberry Valley project. Such payment shall be made in five annual installments, and the moneys paid shall be subject to the same disposition as the proceeds of the sales of lands in the former Indian reservation. All such payments shall be included in the cost of construction of said Strawberry Valley project, to be reimbursed by the owners of lands irrigated therefrom, all receipts from said lands, as rentals or otherwise, being credited to the said owners. All right, title, and interest of the Indians in the said lands are hereby extinguished, and the title, management, and control thereof shall pass to the owners of the lands irrigated from said project whenever the management and operation of the irrigation works shall so pass under the terms of the reclamation act.

To complete the irrigation systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, authorized under the act of June 21, 1906, to be expended under the terms thereof and reimbursable as therein provided, $75,000.

Act of March 3, 1911 (36 Stat. 1074): For continuing the construction of irrigation systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, authorized under the act of June 21, 1906, to be expended under the terms thereof, and reimbursable as therein provided, $75,000.

Act of August 24, 1912 (37 Stat. 537): For continuing the construction of lateral distributing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems authorized under the act of June 21, 1906, to be expended under the terms thereof and reimbursable as therein provided, $75,000.

The Secretary of the Interior is hereby authorized to expend the unexpended balance, which is hereby reappropriated, of the appropriation of $15,000, or so much thereof as may be necessary, appropriated by the act approved March 3, 1911 (34 Stat. 1074), "for the purpose of constructing a bridge across the Duchesne

River at or near the town of Theodore, Utah," for the purpose of straightening the said Duchesne River at or near said bridge, with a view to protecting said bridge.

Act of August 1, 1914 (38 Stat. 604): For continuing the construction of lateral distributing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems authorized under the act of June 21, 1906, to be expended under the terms thereof and reimbursable as therein provided, $10,000, to remain available until expended.

To enable the Secretary of the Interior to protect the north abutment of the bridge at Myton, on the Uintah Indian Reservation, Utah, from high water, $200.

Joint resolution of March 4, 1915 (38 Stat. 1228), reenacted the item of August 1, 1914, for the fiscal year 1916.

Act of May 18, 1916 (39 Stat. 153): For continuing the construction of lateral distributing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems, authorized under the act of June 21, 1906, reimbursable as therein provided, $40,000, to remain available until expended.

* * * * * * *

The Secretary of the Interior is hereby authorized to withdraw from the Treasury of the United States the sum of $1,000, or so much thereof as may be necessary, of the funds on deposit to the credit of the Uintah Tribe of Indians, in the State of Utah, and to use the same to protect the north abutment of the Government bridge at Myton, Utah, under such rules and regulations as he may prescribe, said sum to be immediately available.

Act of March 2, 1917 (39 Stat. 989): For continuing the construction of lateral distributing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems, authorized under the act of June 21, 1906, reimbursable as therein provided, $40,000, to remain available until expended.

Act of May 25, 1918 (40 Stat. 587): The Secretary of the Interior is hereby authorized to withdraw from the Treasury of the United States, within his discretion, the sum of $150,000 of the principal funds to the credit of the Confederated Band of Ute Indians and to expend same for continuing the construction of lateral distributing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems authorized under the act of June 21, 1906, to be immediately available and to remain available until expended.

Act of June 30, 1919 (41 Stat. 27): The Secretary of the Interior is hereby authorized to withdraw from the Treasury of the United States, within his discretion, the sum of $100,000 of the principal funds to the credit of the Confederated Bands of Ute Indians and to expend same for continuing the construction of lateral distriburing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems authorized under the act of June 21, 1906.

Act of February 14, 1920 (Public 141, 66th Cong.), authorized the expenditure of $127,200 of the principal funds to the credit of the Confederated Bands of Ute Indians for continuing construction of lateral distributing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems authorized under the act of June 21, 1906.

Act of March 3, 1921 (Public 359, 66th Cong.), appropriated the sum of $150,000 out of the principal funds to the credit of the Confederated Bands of Ute Indians for continuing the construction of lateral distributing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems authorized by the act of June 21, 1906.

Act of May 24, 1922 (Public 224, 67th Cong.), and act of January 24, 1923 (Public 395, 67th Cong.), each provided for the expenditure of $100,000 for continuing the construction of the lateral distributing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems authorized under the act of June 21, 1906, to be paid from the principal funds held by the United States in trust for the Confederated Bands of Ute Indians.

Act of June 5, 1924 (Public 199, 68th Cong.), authorized $50,000 to be expended for continuing the construction of lateral distributing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems authorized under the act of June 2, 1906, to be reimbursed under such rules and regulations as may be prescribed by the Secretary of the Interior.

Act of March 3, 1925 (Public 580, 68th Cong.), act of May 10, 1926 (Public 206, 69th Cong.), and act of January 12, 1927 (Public 541, 69th Cong.) each provide $16,000 to be expended for continuing construction of lateral distributing systems to irrigate the allotted lands of the Uncompahgre, Uintah, and White River Utes, in Utah, and to maintain existing irrigation systems authorized under the act of June 21, 1906, to be reimbursed under such rules and regulations as the Secretary of the Interior may prescribe.

(*b*) *Executive orders.*—Executive order October 3, 1861, set apart as an Indian reservation the entire valley of the Uintah River within the Utah Territory, extending on both sides of said river to the crest of the first range of contiguous mountains on each side.

Executive order of January 5, 1882, ordered that the following described tract of land in the Territory of Utah be set apart as a reservation for the Uncompahgre Ute Indians:

Beginning at the southeast corner of township 6 south, range 25 east, Salt Lake meridian; thence west to the southwest corner of township 6 south, range 24 east; thence north along the range line to the northwest corner of said township 6 south, range 24 east; thence west along the first standard parallel south of the Salt Lake base line to a point where said standard parallel will, when extended, intersect the eastern boundary of the Uintah Indian Reservation as established by C. L. Du Bois, United States deputy surveyor, under his contract dated August 30, 1875; thence along said boundary, southeasterly to the Green River; thence down the west bank of Green River to the point where the southern boundary of said Uintah Reservation, as surveyed by Du Bois intersects said river; thence northwesterly with the southern boundary of said reservation to the point where the line between ranges 16 and 17 east of Salt Lake meridian will, when surveyed, intersect said southern boundary; thence south between said ranges 16 and 17 east, Salt Lake meridian, to the third standard parallel south; thence east along said third standard parallel to the eastern boundary of Utah Territory; thence north along said boundary to a point due east of the place of beginning; thence due west to the place of beginning.

Executive order of September 1, 1887, set aside as a military reserve for the post of Fort Duchesne, an area 2 miles wide, east and west, and 3 miles long, north and south, within the Uintah Indian Reservation and embracing the site of Fort Duchesne; *Provided*, That the use and occupancy of the land in question be subject to such right, title, and interest as the Indians have in and to the same, and that it be vacated whenever the interest of the Indians shall require it, upon notice to that effect to the Secretary of War.

4. HISTORY

The Uintah Indian Reservation in Utah was established by Executive orders of October 3, 1861, and September 1, 1867, and in 1901 it contained approximately 2,039,040 acres, or 3,186 square miles, all lying within the boundaries of ranges 1 and 2 east, and 1 to 8 west; townships 1 to 3 north and 1 to 3 south, Uintah special base and meridian.

By act of May 27, 1902, the Secretary of the Interior was authorized to obtain consent of the Indians to the allotment of their lands, the allotments to be made prior to October 1, 1903. This act also provided that all unallotted lands within the reservation should be restored to the public domain and persons entering upon same under the homestead laws were to pay therefor the sum of $1.25 per acre, the proceeds to be used for the benefit of the Indians after the United States had been reimbursed for moneys advanced to the Indians.

A joint resolution under date of June 19, 1902, authorized the Secretary of the Interior to set aside for the use of the Indians in common such amounts of nonirrigable grazing lands as would subserve the uses of the Indians for the grazing of their livestock.

The act of March 3, 1903, made an appropriation for the survey of the lands for the purpose of making allotments as provided for in the act of May 27, 1902. This act limited the amount of grazing land to be set apart to 250,000 acres and restricted entries to the unallotted and unreserved lands to the homestead and townsite laws and provided that all lands not entered after the expiration of five years should be disposed of for cash.

The act of April 21, 1904, made an additional appropriation for the surveys of lands, etc., and extended the time for the opening of the reservation to March 10, 1905. This time was further extended by the act of March 3, 1905, to September 1, 1905, unless an earlier date was determined upon by the President.

The act of March 3, 1905, authorized the President to reserve as an addition to the Uintah Forest Reserve such portion of the Indian lands as he thought necessary and to reserve any reservoir sites "or other land necessary to preserve and protect the supply for the Indians or for general agricultural development, and may confirm such rights to water thereon as already accrued, provided that the proceeds from any timber on such addition as may with safety be sold prior to June 30, 1920, shall be paid to such Indians in accordance with the provisions of the act opening the reservation."

Under date of July 1, 1904, the Secretary of the Interior granted authority for the agent in charge to employ a field allotting agent for the purpose of allotting the Uncompahgre Indians or such of them as desired to change their allotments, the allottments previously made to these Indians having never been approved. Under this authority the allotting agent was appointed who proceeded to make allotments partially on the Uncompahgre Reservation and partially on the Uintah Reservation.

A commission was appointed April 3, 1905, to allot to the Indians of the Uintah and Whiteriver tribes, the Uncompahgre Indians having been allotted in 1904. This commission was composed of Mr. W. H. Code, chief engineer of the United States Indian Irrigation Service, Capt. C. G. Hall, Fifth Cavalry, acting Indian agent, and Charles S. Carter of Vernal, Utah. The commission completed its work and the allotments to the Indians were approved on July 18, 1905. The area allotted to the Indians aggregated approximately 103,265 acres.

On July 14, 1905, the President issued a proclamation setting aside as an addition to the Uintah forest reserve 1,010,000 acres of Indian land, and by proclamation of the same date opened the unreserved and unallotted lands, amounting to approximately 1,004,285 acres, to entry on August 28, 1905.

On this date (August 28, 1905), the Indians had under cultivation approximately 6,000 acres of land and were entitled to confirmation of their water rights for this land under the act of March 3, 1905, supra. No confirmation of any water right was made, but instead, the acting Indian agent filed application for appropriation with the State engineer in accordance with the laws of the State of Utah.

On June 21, 1906, an act was passed authorizing the construction of an irrigation system to irrigate the allotted lands, the cost being fixed at $600,000, which was a preliminary estimate of the cost of the completed project. This act provided that the United States should be reimbursed from the proceeds of the sales of lands within the former reservation and that the irrigation system be constructed, completed, held, and operated and the water therefor appropriated under the laws of the State of Utah. The first expenditure made from this appropriation was in September, 1906, all expenditures on this project previous to that time having been made from the funds "Surveying and allotting, irrigation, Indian reservations, 1905–6."

In April, 1905, Mr. W. D. Hill, superintendent of irrigation, and seven men from the Crow and Cheyenne Reservations in Montana, arrived on this project and after establishihg headquarters at Whiterocks immediately began the preliminary work of locating points of diversion and making preliminary locations of the various ditches. This work was completed prior to July 15, 1905, after which the engineer and force were employed in the location of some of the main canals and beginning actual construction work within six months of date of filing as required by the laws of the State of Utah. The work under Mr. Hill's supervision was the first engineering activities on this project, although several ditches had been constructed prior to 1905 by the Indian agents or individual Indians.

This project has been financed by appropriations carried in the act of June 21, 1906, and subsequent Indian appropriation acts, which amount to $1,785,500. The Uintah Canal was the first to be constructed, which was begun in August, 1905, and completed the same year. Work was carried on continuously on the various units except for a few months each year when it was necessary to suspend operations on account of frost, until about the year 1911, when the main canals and main laterals were completed.

About the year 1910 the Dry Gulch Irrigation Co., which is a orporation existing under the laws of the State of Utah, was given permission to enter upon and enlarge the Uintah Canal, Canal No. 1, and lateral 8 of the Lakefork system by decrees of the District Court of the State of Utah. These enlargements were made by the above company and the capacity is being used. By right of purchase of about the same date this company acquired carrying capacity in the Bench Canal, and have been using said capacity since that date. These capacities

have been the subject of a great deal of correspondence and grief in the operation of this project.

The Uintah Basin Construction Co. has also acquired a capacity of 180 second-feet in the Gray Mountain Canal for the first 4½ miles. A workable agreement has been drawn up which meets with the approval of the local officers of the Government and also the Uintah Basin Construction Co.

During the construction period and the period immediately following, development was very slow. About the year 1914 a great deal of advertising was sent out to eastern points, which resulted in the sale and leasing of quite a few allotments. This continued until about 1920, when a marked decrease in land sales was noticed. This apparently was due to the omission of a very attractive feature, "A paid-up water right goes with the land," and in place of this a statement to the effect that it was obligatory on the part of the purchasers to assume responsibility for any unpaid charges.

In the year 1921 quite an extensive program was carried on building small laterals and farm unit ditches in preparation of filing application for certificate of proof of beneficial use with the State engineer.

Considerable difficulties have been experienced since the reservation was thrown open with private irrigation companies and landowners with reference to priority of water rights. About the year 1920 the waters of the Duchesne, Lakefork, Uintah, and Whiterocks Rivers were adjudicated, and a prior right given all Indian lands on which irrigation was contemplated by this project. The fact that Indian lands had a prior right did not seem to overcome the difficulties, however, until a Federal water commissioner was appointed to distribute the water in the order in which the rights were established under the decree. Since this time there has been very little violation of the decree and the Indian lands have been given their allotment of water.

5. LOCATION, TRANSPORTATION, AND MARKETS

The Uintah irrigation project is located in the State of Utah, within the boundaries of ranges 1 and 2 east, 1 to 4 west; townships 1 and 2 north, 1 to 4 south; also a small tract in townships 1 and 2 south, range 7 west, Uintah special meridian, longitude 110 west, latitude 40 to 41 north. The center of the project is 80 miles distant from Price, Utah, and 160 miles east of Salt Lake City. Price is the nearest railroad point, located on the Denver and Rio Grande Western Railroad, and the heaviest shipping point. During some of the summer months a great deal of freight is hauled to and from Salt Lake City. Denver, Colo., is the principal market for livestock, with Kansas City and Minneapolis furnishing a market for the greater part of the alfalfa seed raised on the project.

A stage line is operated daily to and from Price and a line is operated during the summer months to and from Salt Lake City. Daily mail service is had from Price, operated by the Post Office Department.

The transportation of products from the ranches on this project to market is the principal item which is retarding the development of the farms. At present there is a truck line operating under a franchise between Price and Basin points, and also one operating from Salt Lake City. This is quite an improvement over the facilities for handling produce when the project was initiated, but the freight rates, which range from 50 cents to $1 per hundred, depending on the classification, are entirely too high to make the production of bulky crops, such as wheat, potatoes, oats, or practically any of the staple crops in amounts in excess of those which can be used locally, profitable.

Feeding of cattle, which would make it possible to grow alfalfa for hay is also prohibitive from the fact that cattle driven 80 to 100 miles are in no shape to be put on the market.

6. RESERVATION LANDS AND ALLOTMENTS

(*a*) *Area, classification, and estimated value of individual Indian and tribal lands*

Area of reservation	acres	348, 991
Irrigable area	do	87, 591
Grazing land	do	234, 520
Timber land	do	26, 850
Value of irrigable land ($40 per acre)		$3, 503, 640
Value of grazing land ($1.25 per acre)		293, 150
Value of timberland ($28 per acre)		752, 640

(b) *Allotments*

Prior to 1902:		
Uncompahgre—		
Head of family—		
Farming	acres	160
Grazing	do	160
All others—		
Farming	do	80
Grazing	do	80
Subsequent to 1902:		
Uncompahgre—		
Head of family, farming	do	80
All others, farming	do	40
Uintahs and Whiterivers—		
Head of family, farming	do	80
All others, farming	do	40
Total area allotted (approximately)	do	103, 500
Allotments held by trust patent		1, 045
Allotments held by fee patent		8
Trust allotments of deceased allottees		240
Trust allotments having inherited interests in other lands		23
Trust allotments of living allottees who have no interest in other lands		13
Indians who are landless		13
Allottees who have received fee patents and sold to white men		46

7. POPULATION AND INDIAN HEALTH CONDITIONS

Indian tribes (population):	
Uncompahgre	423
Uintah	499
Whiteriver	245
Indian population (1927)	1, 167
Indian births (1926)	30
Indian deaths (1926)	35
Whites (project population, 1927)	4, 860
Cases of tuberculosis	10
Cases of trachoma	520
Indian families (on reservation)	345
Full-blood Indians	1, 003
Less than full blood	164
Indians receiving rations (1926)	96
Increase in population (1920 to 1926)	58
Indian families living in permanent homes	188

8. CLIMATE

Period covered by reliable records, 1917 to date.
Range in elevation of irrigable area (feet), 4,700 to 7,000.
Maximum temperature, 100°; minimum temperature, minus 24°.
Average maximum temperature, 60°; average minimum temperature, 29°.
Average annual precipitation, 7.34.
Average annual rain, 6.50; average annual snow, 0.80.
Average date last killing frost (spring), May 10.
Average date first killing frost (fall), September 30.
Average growing season, 130 days.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

(a) *Topography.*—A topographic survey of the Uintah irrigation project was made under the direction of the United States Geological Survey by C. C. Babb, in the years 1898 to 1901, and is on file in the project office. This map was made on a scale of 1 inch to 1 mile and shows 20-foot contour intervals. The average slope of the irrigable area is 85 feet to the mile, the maximum slope 150 feet, and the minimum slope 20 feet. The entire area of this project might be considered as of fairly uniform slope. However, with the numerous diversions and divisions it has been possible to construct laterals and canals which serve the area by gravity. While some of the slopes are steeper than others, there are none which can

not be irrigated without difficulty. There are a very few isolated knolls or depressions which would involve special engineering, but these difficult features have been overcome to a great extent by dividing the project into numerous units and making a separate diversion for each unit. There are several tracts of land along the Duchesne River which have a few isolated knolls totaling a very small acreage, and which would be impracticable to irrigate.

No accurate data as to the leveling of the project lands in preparation for irrigation is available, but the following is a very close estimate and has been obtained by interviewing ranchers who have actually prepared their land for irrigation.

Smoothest land, leveling	$7
Roughest land, leveling	75–100
Average land, leveling	15– 40

(*b*) *Soil.*—A soil survey was made of the territory adjacent to the Uintah River some years ago, but it covers such a small portion of the project that no effort has been made to procure a copy of it. The exact date of this survey is not known. However, the following tabulation has been made from observations by the project engineer:

Soil	Acreage	Depth	Subsoil
Clay and sandy loam	48,807	1 to 10 feet	Cement-gravel.
Gravelly	28,466	3 inches to 1 foot	Do.

(*c*) *Irrigation methods and water delivery.*—The methods used in irrigation are the corrugation and wild flooding, with the latter prevailing.

The rotation system is being used on approximately 80 per cent of the project area and continuous flow on the remainder. The latter system is used on those canals having their headings in the Duchesne River where there is an ample amount of water to permit a continuous flow. The delivery to these canals on the continuous flow ranges from 3 to 6 acre-feet per season, with an average of approximately 4 acre-feet. The rotation system is used on the canals having their heading in the Lakefork, Uintah, and Whiterocks Rivers. The supply of water for these canals is limited under the laws of the States of Utah to 3 acre-feet per season, which makes it necessary to use the rotation system. The turns are figured on a basis of approximately 3 second-feet flowing on 1 acre of land for a period of 30 to 40 minutes, and receiving an application every 8 days and 6 hours. The range in delivery in acre-feet to these lands is 2 to 3 acre-feet, with an average of 2.75 acre-feet per acre per season.

(*d*) *Drainage.*—The drainage canals constructed on this project could not be considered successful. The largest drain, which is 7 miles in length, is known as the Dry Gulch drain, and handles the drainage water from the lands irrigated by the waters from the Uintah River. This drain handles a great deal of waste water from both Government and privately operated canal systems, and has prevented flooding of approximately 600 acres of Indian allotments lying in the northeast corner of township 3 south, range 1 west, but has not completely reclaimed the land. The total cost of this drain to date is $9,624.65.

The Myton town-site drain is approximately 5 miles in length with a capacity of 20 second-feet. This drain, like the Dry Gulch drain, has prevented the flooding of approximately 600 acres, but has not reclaimed any of this area. This is due to the formation of the subsoil encountered in construction being of a cement-gravel formation, and it was impossible to get a depth exceeding 5 feet with the equipment, which was teams and slips. The entire area above mentioned is worthless unless suitable drainage can be provided and it is very doubtful at the present value of land if it would be advisable to undertake the problem, as practically all the land was purchased under advertistements releasing the purchaser from paying construction charges. Therefore it would seem the only relief for this land would be for the landowners to form a district and provide their own drainage. The total cost of this drain to date is $13,275.83.

The two drains which have been taken up separately, the Dry Gulch and Myton town site, are the only ones of any importance. Numerous small drains have been constructed for a short distance to carry waste water.

There are numerous 40 and 80 acre tracts scattered over the project which have become seeped and water-logged, and it is apparent that there is no remedy for this, as the acreage involved would not justify the construction of proper drainage systems.

Under the Gray Mountain Canal system there is approximately 14,000 acres of land which has become seeped and alkalied to an extent that it is absolutely worthless and can not be reclaimed without an elaborate drainage system, which would consist of a main drain and lateral drains at least every half mile. The same condition exists with reference to the construction of a drain in this district as does in the Myton townsite district. A great many tracts of land which are affected have been purchased by white men under advertisements releasing them from payment of construction charges. It would seem the better thing to do would be to reallot Indians who are affected, if suitable locations can be found, or even purchase land elsewhere, unless the white owners will stand their proportionate part of a drainage system.

The following tabulation shows the capacity, depth, and miles in length of the various drains:

Capacity	Depth	Length
600 second-feet	7 feet	7 miles.
400 second-feet	6 feet	1 mile.
20 second-feet	5 feet	5 miles.
15 second-feet	3 feet	10 miles.

10. WATER SUPPLY AND WATER RIGHTS

(*a*) *Source.*—The water supply is furnished from the water sheds of the Duchesne, Lakefork, Uintah, and Whiterocks River, representing an area of approximately 4,000 square miles. The average elevation is 9,000 feet. No storage has been provided, and the supply for irrigation depends entirely upon the amount of snow which falls during the winter months and the rate of run-off during the season. Usually there is enough to mature all crops if properly distributed and conserved. (Data on stream flow is not accurate enough to make an intelligent estimate.)

The following tabulation is based on the total diversion of all project canals. Data for the year 1927 have not been compiled.

	1922	1923	1924	1925	1926
Acre-feet for season	162,000	170,100	156,200	152,600	144,100
Acres irrigated	54,256	59,116	52,751	55,796	61,119
Acre-feet per acre	3.0	2.9	2.96	2.7	2.3
Average daily flow, second-feet:					
May	400	461	594	579	574
June	886	853	562	564	639
July	721	806	400	457	486
August	531	449	270	358	342
September	336	328	258	292	280

The foregoing tabulation would not indicate that there would be any immediate necessity of providing for additional water supply as the certificates, which are tabulated below, are based on a maximum diversion of 1 second-foot for 70 acres, or a total diversion per season of 3 acre-feet.

Canal	File No.	Certificate		Beneficial proof acres	Second-feet water
		No.	Date		
Bench	358	1235	Nov. 4, 1922	6,307.97	53.00
Do	383	1219	Oct. 18, 1922	920.94	13.32
Do	355c	1174	Sept. 1, 1922	141.60	2.02
Bench (supplemental to 358)	388a	1224	Nov. 4, 1922		9.70
Canal No. 1 (same filing as Uintah Canal)	356	1211	Oct. 18, 1922	3,535.25	50.85
Colorado Park (private capal constructed by E. Harris, Indian)	357a	1233	Oct. 19, 1922	425.14	6.13
Deep Creek	354	1234	Nov. 3, 1922	6,895.52	98.51
Daniels	355b	1173	Sept. 1, 1922	151.00	2.29
U. S. Dry Gulch	403	1228	Oct. 18, 1922	230.36	3.30
Do	359	1213	do	4,247.79	62.20
Do	385	1220	do	393.42	5.81

Canal	File No.	Certificate		Beneficial proof acres	Second-feet water
		No.	Date		
Farmcreek	355	1232	Oct. 19, 1922	1,550.35	
School No. 2	355	1232	do	12.60	23.98
Duncan	355	1232	do	115.90	
Gray Mountain	395	1225	Oct. 18, 1922	4,023.54	52.00
Do	397	1227	do	1,250.63	15.00
Gray Mountain (supplemental to 1225 and 1227)	8911	1444	July 1, 1926		8.38
Harms	3883	1176	Sept. 1, 1922	827.88	11.50
Henry Jim	388	1223	Oct. 18, 1922	1,612.40	24.12
Henry Jim (town of Randlett)	383a	1177	Sept. 1, 1922	(1)	1.00
Jasper Pike	412	1230	Oct. 18, 1922	1,194.51	
Farmcreek Co. (private canal)	412	1230	do	247.98	22.00
Tabby Irrigation Co. (private canal)	412	1230	do	136.40	
(Supplemental to Jasper Pike No. 412)	8910	1443	Jan. 7, 1926		.55
Lakefork	360	1231	Oct. 18, 1922	9,701.43	140.06
Do	402	1171	do	1,230.76	17.58
Leland	386	1236	Nov. 4, 1922	842.20	11.25
Myton town site	364	1216	Oct. 18, 1922	3,562.10	50.00
Myton town site (supplemental to 364 and 382)	382	1218	do	1,388.41	19.85
Myton town site	8909	1442	Jan. 7, 1926		.88
Myton town site (town of Myton)	381	1168	Sept. 1, 1922	(1)	12.00
Ouray School	387	1222	Oct. 18, 1922	3,795.78	45.00
Ouray School (supplemental to 387)	386b	1221	Oct. 18, 1922		3.75
Ouray School (town of Handlett)	386a	1178	Sept. 1, 1922	(1)	4.00
Ouray School (supplemental to 387)	8908	1446	Jan. 7, 1926		5.47
Payne (private canal, supplementary)	360a	1215	Oct. 18, 1922	493.20	1.89
Do	403a	1229	Oct. 18, 1922		6.00
Pahcease	396	1226	Oct 18, 1922	1,070.25	13.00
Pahcease (supplementary to 396)	8912	1445	Jan. 7, 1926		2.40
Redcap	366	1217	Oct. 18, 1922	8,750.64	110.00
Redcap (supplementary to 366)	359a	1214	Oct. 18, 1922		21.05
Uintah (same filing as Canal No. 1)	356	1211	Oct. 18, 1922	5,844.37	84.50
Whiterocks	357	1300	Aug. 31, 1923	4,454.47	68.80
School No. 1	357	1300	Aug. 31, 1923	365.88	
Tabby White (same filing as Deep Creek)	354	1234	Nov. 3, 1922	235.46	3.39
Ditch A	356B	1208	Sept. 2, 1922	73.47	1.00
Ditch B	356a	1212	Oct. 18, 1922	180.20	2.45
Ditch C	356a	1212	Oct. 18, 1922	82.70	1.14
Ditch D	356a	1212	Oct. 18, 1922	185.80	2.56
Big Six (private canal)	355a	1172	Sept. 1, 1922	244.70	3.50
Uteland (private canal)	402a	1175	Sept. 1, 1922	22.90	.33
Wissiup (same as Henry Jim)	388	1223	Oct. 18, 1922	325.70	4.65
Yanawards	411	1179	Sept. 1, 1922	133.49	2.45
Yanawards (town of Duchesne)	414	1056	Jan. 28, 1921	(1)	8.00
Strawberry town site (town of Duchesne)	413	1034	Jan. 28, 1921	(1)	7.00
Total beneficial proof				77,195.09	1,119.61
REDERAL COURT DECREE—IN EXCESS OF PROOF					
Bench Canal (supplements filings)					29.33
Springs (under Deep Creek Canal)				80.00	1.14
Farmcreek, proper (for land above Farm Creek Canal).				135.84	1.94
Whiterocks pipe line (domestic)					.85
Town of Fort Duchesne (domestic)					.85
Randlett through Henry Jim Canal (domestic)					.50
Not yet constructed (filing on Dry Gulch Wash)	9556			(2)	30.00

[1] Municipal. [2] None made

(*b*) *Water rights.*—The waters of the Lakefork, Uintah, and Whiterocks Rivers have been adjudicated in the Federal court for the District of Utah, Docket No. 4427, covering Uintah and Whiterocks, and Docket No. 4418 covering the Lakefork River. The amount of water decreed in the above named rivers varies with the beneficial proof submitted to the State engineer of Utah, in that the amounts of land and water listed in the tabulation under the caption "Federal Court Decree—In Excess of Proof" are not recognized by the State engineer.

The court decrees provide for the appointment of a water commissioner to distribute the waters decreed, the expense thus incurred to be borne one-half by the plaintiff or the Government, and one-half by the defendant companies.

The waters of the Duchesne River have not been decreed but rights of beneficial use have been established for practically all Indian land. The remaining allotments, aggregating approximately 1,300 acres, should be given suitable attention for the establishment of a water right.

The last item in the tabulation is a filing made for the purpose of supplying water to Indian allotments lying southeast of Randlett which as yet have no water rights. This right has not been adjudicated nor has beneficial proof been submitted.

There are a number of allotments which are without a water right. These allotments are scattered over the entire reservation, and practically all of them lie without the boundaries of the present irrigation project. This is the subject of a special report dated June 30, 1927.

II. GENERAL PLAN OF IRRIGATION DEVELOPMENT

(*a*) *General plan.*—This project was designed to irrigate 87,591 acres of allotted lands of the Uintah Indian Reservation, belonging to the Uintah, White River, and Uncompahgre Indians. The total cost of construction to date of December 31, 1927, which is considered as final, is approximately $901,890, or about $10.30 per acre. Construction was begun in 1905 and completed about the year 1912, with the exception of the sublateral systems and farm-unit ditches, which were built during the years 1920 and 1921. The simplest type of construction was used. Apparently it was thought advisable to make a number of diversions instead of combining several units into one large canal or diversion. In fact, the topography of the project would not permit the usual practice of confining the diversions to the fewest number possible. Therefore points were selected at the most advantageous place to serve the area which could be watered by gravity flow with very little difficulty and the lowest cost per acre. Diversion dams were not necessary and were not built, but instead rock-filled cribs were used to control the streams from which the diversions were made. The diversion structures or the main headgates were constructed of timber with occasionally riprap or dry masonry wings.

(*b*) *Divisions or units of project.*—Following the tabulation below, which shows the unit or canal, stream from which it diverts and other data, each canal is taken up separately in detail:

Canal	Base	Capacity (second-feet)	Proof, or irrigable acreage	Miles of main canal	Miles of laterals	Total construction costs
Duchesne River diversions:						
Gray Mountain [1]	16	273	5,274	14.8	33	$78,293
Jasper Pike	6	25	1,194	5.5	6	14,092
Leland	6	15	842	3.5	10	15,194
Myton town site	10	75	5,790	16.5	36	101,085
Ouray School	10	60	4,076	6.3	22	30,702
Pahcease [2]	6	30	1,776	5.9	8	13,926
Strawberry town site [3]	4	15	640	1.0	0	6,247
Yanawards [3]	3	3	132	3.5	0	7,245
Lakefork River diversions:						
Dry Gulch	14	62	4,871	16.5	40	124,951
Lakefork	14	175	11,425	5.4	81	104,603
Redcap	12	110	8,750	5.5	19	93,387
Uintah River diversions:						
Bench [1]	12	130	7,370	8.5	53	64,759
Canal No. 1 [1]	30	250	3,325	8.9	22	6,386
Deepcreek	10	110	6,895	10.0	63	94,991
Harmes	5	15	828	3.0	2	1,138
Henry Jim	5	40	1,682	7.3	9	51,018
Uintah [1]	30	250	5,844	5.0	51	45,232
Whiterocks River diversions:						
Farmcreek	4	25	1,550	6.7	13	23,750
Whiterocks	12	75	4,454	9.6	29	36,846

[1] Enlargements. [2] Carrying capacity for 705 acres included. [3] Capacities estimated.

Gray Mountain unit.—The Gray Mountain Canal diverts from the Duchesne River in sec. 1, T. 4 S., R. 4 W., and flows east along a contour near the base of a steep sidehill for a distance of 14.8 miles. This canal has a capacity of 273 second-feet, base 16 feet, depth 3.5 feet. The lateral system consists of 33 miles of laterals and sublaterals, delivering water to each individual allotment, and making the first delivery 6 miles below the diversion.

The territory served by this system lies in a flat south and adjacent to the Duchesne River, with a slope of approximately 8 feet per mile to the north and varying in width from one-half to 2 miles. The soil is quite hard to classify under this system. The west end is heavy clay, the middle portion of clay, volcanic

ash and a sandy soil closely underlaid with gumbo, while the eastern portion is clay and gravel. Alkali is in evidence on practically the entire area but more pronounced in the middle portion, and several tracts in this district have been abandoned on account of this condition. A drainage parallel to the main canal with lateral drains on approximately all section lines and leading to the river would probably reclaim the greater part of this land. However, in our opinion, this expense could not be justified until land becomes more valuable. This division was completed July 1, 1908.

Total construction cost to Dec. 31, 1927	$78, 293. 00
Construction cost per acre	$14. 80
Total irrigable acreage	5, 274. 17
Total acreage irrigated in 1927	2, 537

Following is a list of structures under this system, which in most cases are those placed when the canal system was originally built:

Bridges	24	Overshots	2
Drops	59	Chutes	3
Flumes	38	Waste gates	1
Lateral gates	94	Checks	33
Turnouts	65	Main diversion	1
Culverts	19	Spillway	1
Undershots	1		

Jasper Pike unit.—The Jasper Pike Canal diverts from the Duchesne River in sec. 24, T. 1 S., R. 8 W., and flows southeast along a contour a distance of 5.5 miles to the end. The capacity of this canal is 25 second-feet, base 6 feet, depth 1.2 feet. The sublateral system consists of 6 miles of lateral and sublaterals making delivery to each allotment, the first delivery being 1.5 miles below the diversion.

The area served by this system lies in a strip adjacent to and north of the Duchesne River, ranging in width from one-fourth to three-fourths mile. The soil is sandy loam, clay, and gravel.

Total construction cost to December 31, 1927	$14, 092. 00
Construction cost per acre	$11. 80
Total irrigable acreage	1, 194. 51
Acreage irrigated in 1927	822. 00

The following is a list of structures on this system, which in most cases are remains of the original construction:

Bridges	4	Culverts	3
Drops	15	Chutes	1
Flumes	6	Checks	9
Lateral gates	41	Main diversion	1

Leland unit.—The Leland Canal has its diversion from the Duchesne River in sec. 20, T. 3 S., R. 2 E., and follows a contour 3.5 miles to the end. The main canal has a capacity of 15 second-feet, base 6 feet, depth 1.5 feet. The lateral system is composed of 10 miles of laterals and sublaterals.

The area served by this system lies south and adjacent to the Duchesne River. The soil is sandy loam and clay. This division was completed July, 1908.

Total construction cost to December 31, 1927	$15, 194. 00
Construction cost per acre	$17. 68
Total irrigable acreage	842. 20
Acreage irrigated in 1927	343. 00

The following is a list of structures on this system, which in most cases are remains of the original construction:

Bridges	1	Waste gates	2
Drops	2	Checks	2
Lateral gates	15	Main diversion	1

Myton Townsite Canal.—The Myton Townsite Canal has its diversion in the Duchesne River in sec. 21, T. 3 S., R. 3 W., and follows a contour practically the entire length, which is 16.5 miles. This canal has a capacity of 75 second-feet, 10-foot base, 2.5-foot depth. The lateral system consists of 12 main laterals and sublaterals, totaling 36.5 miles, which make delivery to each individual allotment, the first delivery being made one-half mile below the heading.

The territory watered by this system lies in a flat adjacent to the Duchesne River which varies in width from one-half to 1½ miles, and has a slope to the east and north of approximately 5 feet to the mile. Practically all the soil under this system is heavily saturated with alkali, but produces good crops if water is not used excessively. There is quite an area under this canal which is seeped or waterlogged. This division was completed July 25, 1908.

Total construction to December 31, 1927	$101, 085. 00
Construction cost per acre	$17. 45
Total irrigable acreage	5, 790. 51
Total acreage irrigated in 1927	2, 827. 00

Following is a list of structures under this system, which in most cases are those placed when the canal system was originally built:

Bridges	32	Undershots	3
Drops	20	Chutes	2
Lateral gates	42	Waste gates	1
Flumes	31	Checks	41
Turnouts	78	Main diversion	1
Culverts	31		

Ouray School Canal.—The Ouray School Canal diverts from the Duschesne River in sec. 20, T. 3 S., R. 1. E., and flows northeast along a contour a distance of approximately 3 miles, and from this point divides, one branch flowing due east and the other branch flowing south one-half mile, thence due east along a ridge. The total length of the canal is 6¼ miles, its capacity is 60 second-feet, 10-foot base, and 2.5-foot depth. The lateral system consists of 8 laterals and sublaterals, totaling 22 miles in length, which deliver water to each individual allotment, making the first delivery one-half mile below the diversion.

The territory watered by this system lies on a flat adjacent to the Duchesne River, and has a slope to the east and south of approximately 5 feet to the mile. The principal part of the soil under this canal is a clay formation which is quite easily alkalized when water is used excessively. This division was completed October, 1908.

Total construction to December 31, 1927	$30, 702. 00
Construction cost per acre	$7. 52
Total irrigable acreage	4, 075. 78
Acreage irrigated in 1927	1, 908. 00

Following is a list of structures under this system, which in most cases are those placed when the canal system was originally built:

Bridges	9	Culverts	6
Drops	31	Chutes	2
Flumes	4	Checks	13
Lateral gates	91	Main diversion	1

Pahcease Canal.—The Pahcease is a small canal diverting from the Duchesne River in sec. 35, T. 3 S., R. 3 W., extending in a northerly direction for a distance of approximately 5 miles along a contour line. The main canal has the following dimensions: Bottom width, 6 feet; top width, 16 feet; capacity in cubic second-feet, 30. The lateral system is composed of 4 miles of main laterals and 4 miles of sublaterals.

The territory served by this canal lies along the Duchesne and Lakefork River bottoms just above the junction of the two streams. The soil is clay with considerable alkali in some sections. The general slope of the country is to the east with part of it sloping to the Duchesne River and part of it sloping toward the Lakefork. This division was completed, November, 1908.

Total construction to December 31, 1927	$13, 926. 00
Construction cost per acre	$13. 01
Total acreage irrigable	1, 070. 25
Acreage irrigated in 1927	727. 00

The following is a list of structures on this system, which in most cases are remains of the original construction:

Bridges	3	Culverts	1
Drops	21	Checks	2
Flumes	4	Main diversion	1
Lateral gates	52	Spillways	1

Strawberry town site unit.—The Strawberry town site diverts from the Duchesne River in sec. 5, T. 4 S., R. 5 W., and flows in a southwesterly direction, ending in Strawberry River. This canal was constructed to irrigate some lots in the city of Duchesne, which was then known as the Strawberry town site. The only information available on this canal is that it was built in 1908 by the Indian irrigation service, and has a total charge assessed against it of $6,247.

Yanawards Canal.—The Yanawards Canal diverts from the Duchesne River in sec. 24, T. 3 S., R. 5 W., and flows south a distance of approximately 2 miles, thence southeast, the total length of the main canal being 3¼ miles. There are no laterals under this system.

The territory watered by the Yanawards Canal lies in the flats along the Duchesne River. The only Indian lands served by this canal are 122 acres of the W. ½ W. ½ sec. 25, T. 3 S., R. 5 W., and 10 acres lying in sec. 6, T. 4 S., R. 4 W. The soil is of sandy loam and clay, with an occasional patch of gravel. This system also waters some lots in the city of Duchesne. The Yanawards ditch has not been operated by the Indian Irrigation Service for several years and has been the subject of several reports. This division was completed, November, 1908.

Total construction to December 31, 1927	$1, 908
Total irrigable acreage	132

The only structures placed by the Indian irrigation service so far as known is the main diversion gate from the Duchesne River.

United States Dry Gulch Canal.—The United States Dry Gulch Canal is the lowest diversion on the Lakefork River. The heading is on the left bank of the river in sec. 12, T. 3 S., R. 3 W., the main canal running on a contour from that point eastward to a point near the west quarter corner of sec. 17, T. 3 S., R. 1 W., a distance of approximately 10 miles along the canal line. At this point the canal divides into two branches, the north fork of which continues on a distance of 5 miles and the south fork a distance of 6 miles. The hydraulic data of the main canal is as follows: Length, 87,027 feet; top width, 32 feet; bottom width, 16 feet; capacity, 32 second-feet. The lateral system consists of 22.5 miles of main laterals and 17 miles of sublaterals which flow south and east toward the Duchesne River along the general slope of the territory, except below the forks of the main canal, where the water drains toward the bottom of a natural draw which runs eastward.

The soil is a heavy clay in most cases and difficult to subdue, but being productive when once put under cultivation. Crops are of the general farm type with hay and alfalfa seed predominating. This division completed, May 25, 1908.

Total construction cost to December 31, 1927	$124, 951. 00
Construction cost per acre	25. 64
Total irrigable acreage	4, 871. 57
Acreage irrigated in 1927	2, 809. 00

The following is a list of structures on this system, which in most cases are remains of the original construction:

Bridges	26	Undershots	1
Drops	79	Overshots	2
Flumes	52	Chutes	5
Lateral gates	181	Checks	12
Turnouts	9	Spillways	3
Culverts	22	Main diversion	1

Lakefork Canal.—The Lakefork Canal diverts from the Lakefork River in sec. 32, T. 1 N., R. 4 W., of the Uintah special base line and meridian, immediately below the confluence of the Yellowstone Creek and the Lakefork. The main canal follows a contour line southeastward for a distance of approximately 2 miles until it reaches the top of Altonah bench, from where it takes a more easterly direction, continuing across the bench for an additional distance of 4 miles to a junction with a natural draw which acts as a spillway for any excessive heads collected as storm water. The hydraulic data for the main canal is as follows: Length, 28,800 feet; bottom width, 14 feet; top width, 30 feet; capacity, 175 cubic second-feet. The lateral system is composed of 15 main laterals, totaling 31 miles, paralleling each other along the north and south lines, one-fourth mile apart. Laterals running southward have excessive fall, but the cemented subsoil prevents deep cutting, so that very few expensive structures have been necessary in this territory.

The territory served by the Lakefork Canal is composed of two units, one of 9,701.43 acres lying on the Altonah bench which slopes uniformly southward and

eastward at a rate of approximately 100 feet per mile, and a second composed of 1,230.76 acres known as the Lakefork extension district, the two units aggregating 10,932.19 acres of Indian land, on which proof of beneficial use of water has been made. The soil over the entire area served by the Lakefork Canal is a thin, sandy loam underlaid by a layer of demented boulders and gravel. The principal crop is hay, although numerous small tracts of grain are in evidence and alfalfa seed has been produced to some extent. However, dairying is the one industry to which this section is best adapted and to which the farmers are generally leaning. This division completed June, 1907.

Total construction cost to Dec. 31, 1927	$104,603.00
Construction cost per acre	$9.12
Total acreage irrigable	11,425.39
Acreage irrigated in 1927	11,308.00

The following is a list of structures on this system, which in most cases are remains of the original construction:

Bridges	29	Culverts	37
Drops	88	Undershots	9
Flumes	65	Chutes	1
Lateral gates	318	Checks	118
Turnouts	3	Main diversion	1

Redcap Canal.—The Redcap Canal has its heading in the Lakefork River in sec. 4, T. 3 S., R. 3 W., the main canal running from this point southwest for a distance of approximately 2 miles, thence south an additional distance of 2 miles, thence east 1½ miles, where it empties into the Redcap Wash. The hydraulic data of the main canal is as follows: Top width, 28 feet; bottom width, 12 feet; capacity, 110 cubic feet. The lateral system extends to the east of the main canal, serving efficiently the 8,750.64 acres embraced in the system. There are 19 miles of main laterals and sublaterals.

The slope of the territory is toward the southeast at a rate of 40 feet per mile, the uniformity of the topography being broken by a small ridge which traverses the whole area in a southeasterly direction. The soil is a deep heavy clay which washes easily, a condition which makes numerous drops and checks necessary. As a whole, the soil is above the average in fertility when once subdued. There are, however, some small tracts which are saturated with alkali, making production impossible. This division completed in the summer of 1908.

Construction cost to Dec. 31, 1927	$93,387.00
Construction cost per acre	$10.67
Total irrigable acreage	8,750.64
Acreage irrigated in 1927	5,698.00

The following is a list of structures on this system which in most cases are remains of the original construction:

Bridges	36	Lateral gates	321
Drops	232	Culverts	22
Flumes	56	Chutes	3
Checks	10	Main diversion	1

Bench Canal.—The Bench Canal, having its heading in the Uintah River in sec. 18, T. 1 S., R. 1 E., is one of the oldest canals on the project. The main canal flows southward along Indian bench for a distance of 8½ miles, where it enters a natural draw and goes off the bench a distance of approximately 2 miles, where it divides into two laterals, known as the bench extension and lateral No. 12. The hydraulic data of the main canal is as follows: Length, 45,700 feet; top width, 22 feet; bottom width, 12 feet; capacity, 150 cubic second-feet. The lateral system is composed of 16 laterals diverting from the main canal, totaling 52 miles in length, with numerous sublaterals making deliveries to farm units, and totaling 21 miles in length.

The area served by this system lies partially on what is known locally as Indian bench and partly along the Uintah River, and partly along the Dry Gulch wash. The upper or northern portion is composed of a light sandy and gravelly soil underlaid with cemented cobblestone, while the lower portion, including the area along the river and Dry Gulch wash, is a deep, heavy soil of the clay type. The slope, while not uniform, is in general toward the southeast, at the rate of about 30 feet per mile. This division completed in the fall of 1907.

Total construction cost to Dec. 31, 1927	$64,759.00
Construction cost per acre	$8.78
Total irrigable acreage	7,370.51
Total acreage irrigated in 1927	5,662.00

The following is a list of structures on this system, which in most cases are remains of the original construction:

Bridges	17	Culverts	29
Drops	33	Undershots	5
Flumes	45	Chutes	1
Lateral gates	257	Checks	130
Turnouts	1	Main diversion	1

Canal No. 1.—Canal No. 1 diverts from the Uintah River in sec. 25, T. 1 N., R. 1 W., and runs southwest for a distance of approximately 8.9 miles on a contour line. The lateral system is composed of two main laterals, one on each division or bench, as later described, and several small sublaterals, totaling 22.5 miles in length. The hydraulic data for the main canal is as follows: Length, 47,300 feet; top width, 42 feet, approximately; bottom width, 30 feet, approximately; capacity, 250 cubic second-feet. The capacity is considerably larger than necessary for the Indian land because this is a jointly used canal.

The land is divided roughly into two equal divisions by a draw, on each side of which is a bench or mesa sloping southeastward. The soil is a shallow, sandy loam containing considerable gravel and underlaid with a cemented cobble formation. This is in the same general section as the Uintah Canal, and the crops and ndustries are the same.

Total construction to Dec. 31, 1927	$6,386.00
Construction cost per acre	$1.67
Total irrigable acreage	3,525.25
Acreage irrigated in 1927	3,386.00

The following is a list of structures on this system, which in most cases are remains of the original construction:

Bridges	6	Culverts	3
Drops	15	Main diversion	1
Flumes	14	Spillway	1
Latera] gates	78	Checks	30
Turnouts	2		

Deepcreek Canal.—The Deepcreek Canal diverts from the Whiterocks River in sec. 5, T. 1 S., R. 1 E., and flows in an easterly course a distance of 10 miles to the end, and has a capacity of 110 second-feet, base 10 feet, depth 2.7 feet. The lateral system consists of 63 miles of laterals and sublaterals which deliver water to each individual tract of land.

The area served by this system has a general slope to the south of approximately 25 feet per mile with a slight slope from the east and west boundary to the center. The soil is heavy clay and sandy loam, is very productive, and is quite free from alkali, which is so much in evidence on other canals which divert from the Duchesne River. This division completed December, 1905.

Total construction cost to Dec. 31, 1927	$94,991.00
Construction cost per acre	$13.77
Total irrigable acreage	6,895.52
Acreage irrigated in 1927	5,382.00

The following is a list of timber structures on this system, which in most cases are those placed when the canal system was originally built:

Bridges	20	Undershots	3
Drops	176	Chutes	1
Flumes	65	Waste gates	4
Lateral gates	231	Checks	25
Turnouts	7	Spillway	1
Culverts	27	Diversion	1

Harmes Canal.—The Harmes is a small canal, having a capacity of 15 second-feet, which diverts from the Uintah River in sec. 6, T. 1 S., R. 1 E., and paralleling Uintah River a distance of approximately 3 miles to irirgate 828 acres of Indian

land. Three small laterals, totaling 2 miles in length, divert from the main canal, carrying water to the high corner of each 40-acre tract.

The territory covered by this canal is of the river-bottom type, and in this instance has some clay content with a considerable area of gravel and bowlders. These allotments are used almost exclusively as pasture, although some hay and grain are produced.

Total construction cost to Dec. 31, 1927	$1,138.00
Construction cost per acre	$1.37
Total irrigable acreage	827.88
Acreage irrigated in 1927	804.00

The following is a list of structures on this system, which in most cases are remains of the original construction:

Bridges	2	Culverts	4
Drops	3	Checks	10
Flumes	3	Main diversion	1
Lateral gates	17		

Henry Jim Canal.—The Henry Jim Canal diverts from the Uintah River in sec. 26, T. 2 S., R. 1 E., and follows a contour for approximately 3½ miles in a southeasterly course. From this point it is dropped down to a lower level by means of a chute and drops, and then follows very closely along the edge of a rocky bench. The total length of the main canal is 7.3 miles, the capacity is 40 second-feet, 5-foot base, 2.3-foot depth. The lateral system consists of 8 main and sublaterals, totaling 8.5 miles in length, which deliver water to each individual allotment, making the first delivery one-quarter mile below the diversion.

The territory watered by this system lies along the Uintah River and slopes to the south at a rate of approximately 10 feet per mile, and ranges in width from one-half to 1½ miles. The soil under this system is a heavy clay and sandy loam, and in most cases is very fertile and produces good crops if handled in the proper manner. This division completed in the spring of 1910.

Total construction cost to Dec. 31, 1927	$51,018.59
Construction cost per acre	$30.32
Total irrigable acreage	1,682.40
Acreage irrigated in 1927	1,255.00

Following is a list of structures on this system. In most cases, these structures were built when the canal was originally constructed.

Bridges	13	Chutes	2
Drops	21	Checks	14
Flumes	9	Main diversion	1
Lateral gates	15	Turnouts	29
Culverts	3		

Uintah Canal.—The Uintah Canal diverts from the Uintah River in sec. 5, T. 1 N., R. 1 W., and runs in a southeast direction almost paralleling the Uintah River for a distance of approximately 5 miles. The first 1½ miles of canal follows a natural draw and has a slope uniform with the surroundiug country which amounts to approximately 80 feet per mile. The gravel and bowlder composition of the soil prevents excessive cutting and makes drops unnecessary, regardless of the excessive grade. The lower 4½ miles of main canal follows a contour line making the use of checks and drops practically unnecessary. The hydraulic data for the canal is as follows: Length, 28,360 feet; bottom width, 30 feet; top width, 50 feet; capacity, 250 cubic second-feet. The capacity of this canal is excessive for Indian acreage, as it is a jointly used canal. The lateral system is composed of six main laterals and numerous small sublaterals, totaling 51.5 miles, running south along subdivision lines in such a manner that delivery of water can be made on the high corner of any 40-acre tract.

The area of 5,844.37 acres of Indian land is composed of a light sandy soil mixed with considerable gravel and underlaid with a cemented layer of cobble rock. The principal crop in this section is hay, although grain and garden truck seem to produce well. There is a creamery in the vicinity, and dairying is fast becoming the principal industry. This division completed in October, 1905. Total construction cost to December 31, 1927, $45,232. Construction cost per acre, $7.67. Total acreage irrigable, 5,844.37. Acreage irrigated in 1927, 5,729.

The following is a list of structures on this system, which in most cases are remains of the original construction:

Bridges	12	Turnouts	1
Drops	7	Culverts	7
Flumes	38	Checks	51
Lateral gates	195	Main diversions	1

Farmcreek Canal.—The Farmcreek Canal has its diversion from the Whiterocks River in sec. 19, T. 2 N., R. 1 E., and flows southwest along a contour a distance of 6.7 miles, has a capacity of 25 second-feet, 4-foot bottom width, and 8-foot top width. The lateral system consists of 13 miles of laterals and sublaterals, serving each individual allotment, making the first delivery 1 mile below the diversion.

The area irrigated by this system lies between the Uintah and Whiterocks Rivers, with a general slope to the south of approximately 50 feet per mile, and varies in width from one-fourth to 1 mile, sloping slightly from the east and west boundaries to a well-defined channel, which flows north and south through the center of the district, affording very good drainage. The soil is of sandy loam and clay underlaid in most cases with a cement gravel varying in depth under the surface of from 6 inches to 10 feet. This division was completed August, 1907. Total construction cost to December 31, 1927, $23,750. Construction cost per acre, $15.31. Total irrigable acreage, 1,550.35. Total acreage irrigated in 1927, 1,686.

NOTE.—Acreage irrigated in 1927 under Farmcreek includes irrigated acreage under Duncan and School No. 1. This proof acreage for Duncan and School No. 1 Canals is shown under "Individual Indian ditches."

The following is a list of structures, which are of timber construction. In most cases the structures are those built during the construction of the system:

Bridges	3	Culverts	6
Drops	14	Chutes	1
Flumes	14	Waste gates	1
Lateral gates	49	Checks	8
Turnouts	4	Main diversions	1

Whiterocks Canal.—The Whiterocks Canal diverts from the Whiterocks River in sec. 19, T. 2 N., R. 1 E., and flows southeast on contour a distance of 3.7 miles, thence south along a ridge for 4 miles, thence shoutheast to the end. The total length of the main canal is 9.6 miles, has a capacity of 75 second-feet, base 12 feet, depth 2 feet. The lateral system consists of 29 miles of main laterals and sublaterals, delivering water to each individual allotment, making the first delivery 1 mile below the diversion gate.

The territory watered by this system lies on a bench which slopes to the south at a rate of approximately 100 feet per mile, ranging in width from one-half to 1½ miles. The excessive slope traversed by this canal necessitates numerous checks and drops to make delivery. The soil is closely underlaid with gravel on the north half of this system; in fact, in some places soil is hardly in evidence at all. Approximately 5.5 miles below the diversion the canal drops from the upper bench to a lower bench by means of a series of drops. The soil below this point is generally clay and rocks and gravel is not so much in evidence. This division was completed August, 1907. Total construction to December 31, 1927, $36,846. Construction cost per acre, $8.27. Total irrigable acreage, 4,454.47. Total acreage irrigated in 1927, 3,521.

The following is a list of structures on this system, which in most cases are remains of the original construction:

Bridges	4	Culverts	12
Drops	40	Chutes	1
Flumes	21	Checks	44
Lateral gates	127	Main diversions	1
Turnouts	3		

12. SUMMARY OF PROJECT WORKS

(a) *Storage.*—No storage structures have been built on this reservation.

	Number	Type
(b) Diversions		
Main canal head gates	22	Timber.
Bridges	228	Do.
Drops	835	Do.
Flumes	458	Do.
Do	4	Metal.
Lateral gates	2,115	Timber.
Turnouts	174	Do.
Culverts	230	Do.
Undershots	22	Do.
Overshots	4	Do.
Chutes	25	Do.
Waste gates	9	Do.
Checks	550	Do.
Spillways	7	Do.

	Number of canals	Length (miles)
(c) Canals		
Capacity:		
200 to 300 second-feet	3	28.7
150 to 200 second-feet	1	5.4
100 to 150 second-feet	3	24.0
50 to 100 second-feet	4	48.9
5 to 50 second-feet	8	35.5
(d) Laterals		
Various capacities		497.0
Total		639.5
(e) Drainage canals		
Capacity:		
600 second-feet		7.0
400 second-feet		1.0
20 second-feet		5.0
15 second-feet		10.0

	Dimensions	Construction	Building No.
(f) Buildings			
Office building	32 by 34	Cement block	6
Garage	24 by 50	Timber	1
Coal, ice, and wood	22 by 33	do	5
Pump house and water tank	16 by 16 by 50	do	2
Engineer's residence	32 by 48	Cement block	8
Residences:			
Supervisor's	32 by 44	Timber	4
Do	30 by 50	do	16
Teamster's	12 by 24	do	9
Do	24 by 30	do	18
Ditch rider's	14 by 24	do	10
Do	16 by 24	do	11
Do	14 by 24	do	12
Do	24 by 24	do	13
Do	14 by 24	do	14
Do	14 by 50	do	17
Do	14 by 16	do	27
Do	14 by 24	do	15
Barns:			
At Myton	50 by 50	do	3
At Whiterocks	30 by 60	do	20
Warehouses:			
At Myton	30 by 60	do	7
At Whiterocks	14 by 16	do	19
Sheds:			
Wagon	25 by 100	do	21
Buggy	24 by 33	do	25
Coal	11 by 47	do	26

12. SUMMARY OF PROJECT WORKS—continued

	Dimensions	Construction	Building No.
(f) Buildings—Continued.			
Machine shop	17 by 24	Timber	22
Stable	10 by 33	do	24
Do	14 by 18	do	23
Do	12 by 16	do	28
Do	12 by 16	do	29
Do	12 by 48	do	30
(g) Telephone lines			
Miles of telephone lines			121
Telephone stations			25

13. AREA AND UTILIZATION OF IRRIGABLE LANDS

	1924	1925	1926
(a) Utilization of Government project lands			
(Entire project)			
1. Acreage arable	87,591	87,591	87,591
2. Acreage irrigable	87,591	87,591	87,591
3. Acreage irrigated	53,252	55,795	61,119
4. Acreage cultivated	53,252	55,795	61,119
5. Total crop value		$1,529,747.00	$1,284,123.00
6. Average crop value		$27.40	$21.00
7. Indians farming		281	262
8. Lessees farming	400	422	349
9. White owners farming	348	351	350
(b) Utilization of land owned by Indians and not leased			
(Government project, farmed by Indians)			
1. Acreage arable	29,811	40,904	28,206
2. Acreage irrigable	29,811	40,904	28,206
3. Acreage irrigated	8,646	14,444	14,785
4. Acreage cultivated	8,646	14,444	14,785
5. Families farming	172	281	262
6. Acreage cultivated per family	50	51	56
7. Total crop value		$396,497.00	$311,840.00
8. Crop value (acre)		$27.40	$21.00
9. Crop value (family)		$1,411.00	$1,190.00
(c) Utilization of land owned by Indians and leased			
(Government project, farmed by lessees)			
1. Acreage arable	41,280	25,565	38,000
2. Acreage irrigable	41,280	25,565	38,000
3. Acreage irrigated	27,634	22,996	28,334
4. Acreage cultivated	27,634	22,996	28,334
5. Number of lessees	400	422	349
6. Total crop value		$630,250.00	$592,663.00
7. Crop value (acre)		$27.40	$21.00
(d) Utilization of land owned by whites			
1. Acreage arable	16,500	21,122	21,385
2. Acreage irrigable	16,500	21,122	21,385
3. Acreage irrigated	16,972	18,355	18,000
4. Acreage cultivated	16,972	18,355	18,000
5. Total crop value		$503,000.00	$379,620.00
6. Crop value (acre)		$27.40	$21.00

NOTE.—It will be noted that items 1 and 2 are the same. This is for the reason that proof was made on irrigable land and this entire acreage can be served from the canals. Also items 3 and 4 are the same. The reason for this is that the Federal water commissioner distributes water with reference to the cropped acreage; therefore all acreage irrigated is cultivated.

14. PRINCIPAL CROPS, CROP YIELDS, AND RETURNS, 1926

Crop	Acreage	Yield	Unit price	Per acre value	Total value
(a) Cultivated by Indians					
Wheat	1,224	18 bushels	$0.95	$17.10	$20,930.40
Oats	800	30 bushels	.60	18.00	14,400.00
Corn	246	35 bushels	1.00	35.00	8,610.00
Alfalfa (hay)	5,950	3 tons	9.00	27.00	160,650.00
Alfalfa seed	1,975	200 pounds	.14	28.00	12,100.00
All other crops	3,985			10.00	39,850.00
Total	14,785				311,840.40
(b) Cultivated by lessees					
Wheat	2,330	18 bushels	.95	$17.10	39,843.00
Oats	1,530	30 bushels	.60	18.00	27,540.00
Corn	470	35 bushels	1.00	35.00	16,450.00
Alfalfa (hay)	11,410	3 tons	9.00	27.00	308,070.00
Alfalfa seed	3,790	200 pounds	.14	28.00	106,020.00
Clover seed	1,160	250 pounds	.08	20.00	23,200.00
All other crops	7,644			9.60	71,540.00
Total	28,334				592,663.00
(c) Cultivated by white owners					
Wheat	1,513	18 bushels	.95	17.10	25,872.30
Oats	967	30 bushels	.60	18.00	17,406.00
Corn	300	35 bushels	1.00	35.00	10,500.00
Alfalfa (hay)	7,246	3 tons	9.00	27.00	195,642.00
Alfalfa seed	2,395	200 pounds	.14	28.00	67,060.00
Clover seed	735	250 pounds	.08	20.00	14,700.00
All other crops	4,844			10.00	48,440.00
Total	18,000				379,620.30

NOTES.—Information relative to per acre crop productions and returns for the year 1924 is not available. By consulting white landowners and lessees for the years 1925 and 1926, a basis was arrived at, as shown. The above information for these years was not taken on land farmed by the Indians themselves, but was based on the returns for the white cultivated land.

15. ECONOMIC CONDITIONS AMONG PROJECT FARMERS

	1924	1925	1926
Indian farmers			
Families farming	172	281	262
Acreage cultivated	8,646	14,444	14,785
Acreage per family	50	51	56
Average crop value per family		$1,411.00	$1,190.00
Total livestock (1927 only):			
Horses 955			$19,100.00
Dairy cows 671			$20,130.00
Beef cattle 150			$7,500.00
Sheep 524			$4,192.00
Hogs 95			$1,425.00
Total farm equipment:			
Plows 173			$3,460.00
Mowers 132			$5,280.00
Tractors 4			$1,200.00
Autos 30			$7,500.00
Trucks			None.
Acreage Indian land leased	27,634	22,996	28,334
Average rental per acre	$1.25	$1.25	$1.25
Average annual per capita payment from tribal resources		$50.54	$49.94
Total Indian reimbursable debt not including irrigation	$154,682.98	$160,861.54	$161,332.62
Total Indian tribal fund	$465,340.00	$335,176.91	$318,288.56
Annual acre construction assessment on Indian land	(1)	(1)	(1)
Annual operation and maintenance assessment on Indian land (average)	$0.68	$0.56	$0.56
Non-Indian farmers			
Number of land owners (heads of families only)	348	351	350
Acreage	26,815.23	27,135.23	27,907.23
Acreage cultivated (owners)	16,942	18,355	18,000
Acreage leased	41,280	24,565.52	38,000
Acreage cultivated (lessees)	27,634	22,996	28,334
Average acre crop value	No data.	$27.40	$21.00

[1] 5 cents to 55 cents per acre.

16. PROJECT OPERATION AND MAINTENANCE

(a) *Organization*

Project engineer: Salary, $3,300 gross; duties, general supervision of Uintah irrigation project.

Principal clerk: Salary, $2,100 net; duties, general supervision of office, including correspondence, water ledgers, collections, materials and supplies, and equipment records.

Timekeeper: Salary, $100 per month; duties, compiling time sheets submitted by ditch riders, stenographic work, monthly reports, operation and maintenance bills, and collections.

Instrumentman: Salary, $1,860; duties, preparing rotation schedules, surveys, hydrographic work, and preparing maps and statistics for reports.

Caretaker: Salary, $90 per month; duties, has charge of the warehouse, upkeep of headquarters buildings, janitor work, and repairing of tools and other equipment.

Supervisors of canals (2): Salaries, $2,100 and $2,400; duties, the supervisors are in charge of the operation and maintenance of the canals during the nine summer months, and repairs to equipment and Government property during the three winter months.

Ditch riders (17): Salaries, $135 per month; duties, distributing water, maintaining and repairing canals. Employed from five to seven months each year.

(b) *Annual expense*

Labor cutting brush	$1,798.51
Labor repairing structures	1,994.47
Maintenance and supplies, repairing structures	1,699.73
Maintenance and supplies, replacing structures	1,715.55
Labor replacing structures	2,444.19
Teams and labor cleaning canals	4,648.89
Ditch riders, salaries	13,982.22
Supervision of canals, labor	3,951.20
Supervision of canals, auto expense	1,580.48
General expenses, Myton office	6,321.92
Blackfoot office	4,741.44
Chief Engineer's Office	790.24
Depreciation on equipment	3,160.96
Miscellaneous, flood, repairs, etc	4,160.02
Replacement of timber structures by more permanent type	10,000.00
Total	62,989.82

Average operation and maintenance cost for past three years	.60
Average operation and maintenance cost per acre irrigable	.60
Average operation and maintenance cost per acre cultivated	.80
Average maintenance cost per mile of canals and laterals	25.00
Average operation cost per mile of canals and laterals	48.00

NOTE.—A discrepancy will be noted in the total of principal items included in operation and maintenance annual cost and the total of $46,647, which is the amount shown based on per mile cost of maintenance and per mile cost of operation. This is explained by the amounts which are billed private companies for carrying capacities in project canals which are included in the total of principal items and not included in the average operation and maintenance cost or the per mile cost.

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(a) *Construction cost to June 30, 1927*

Reimbursable appropriations	$340,706.26
Nonreimbursable appropriations	77,064.65
Tribal funds	510,210.13
	927,981.04
Miscellaneous costs (not irrigation)	14,084.18
Total construction cost, including Chief Engineer's office	915,896.86

(b) Collection of construction cost

Total construction assessments to date	$1,522.88
Total construction collections to date (white owners only)	1,522.88
Total construction delinquencies to date	Records incomplete.
Total penalties on delinquencies to date	Records incomplete.
Rate of penalty on delinquencies to date	Records incomplete.

No collections have been made of construction costs on this project, except those which have been collected by the reservation superintendent.

The act of Congress of February 14, 1920 (41 Stat. 408) provides that the Secretary of the Interior shall require the owners of irrigable land under any irrigation system heretofore or hereafter constructed for the benefit of the Indians and to which water for irrigation purposes can be delivered to begin partial reimbursement of the construction charges where reimbursement is required by law.

In pursuance of this provision of Congress, the Secretary, on June 21, 1920, promulgated regulations directing that land owners should pay, on or before November 15, 1920, a sum equal to five per centum of the per acre cost, as of June 30, 1920, of the construction of the system under which such land is situated. These regulations were modified by Circular 1677, dated May 12, 1921, and later modified by Circular 1677a, dated June 13, 1925.

According to office letters and circulars, construction charges have been assessed against Uintah project lands since June 1, 1920, and have been accruing since that time. Instructions were issued to the Superintendent of the Uintah and Ouray Reservation setting forth the conditions for the collection of construction charges, with specific reference to the fact that all accrued charged were to be collected from white purchasers of Indian lands. These instructions stated that all purchasers of Indian lands purchased subsequent to May 1, 1920, were required to execute a contract and pay their share of the cost of the project construction.

Circular 1624a dated July 3, 1927, and approved July 25, 1927, further modified the requirements of the Act of February 14, 1920, providing for the payment of construction costs in 40 years, or an annual construction charge of 2½ per cent of the per acre construction cost.

In accordance with the above regulations and office circulars, preparation is being made to bill all white land owners for the 2½ per cent construction charge on November 15, in accordance with the above act of Congress.

No provision has yet been made for the collection of construction charges from Indians. The act of August 1, 1914, shifted the burden from the tribal fund to the individual Indians whose lands are irrigable under the system, and these Indians are required to pay their share of construction costs. However, the Indians are not financially able to make construction payments, and no attempt has been made so far to collect construction charges.

(c) Operation and maintenance costs to June 30, 1927

Reimbursable appropriations	$199,994.21
Nonreimbursable appropriations	308,317.98
Tribal funds	316,824.26
Collections used	193,788.99
Liabilities	4,819.50
Total	1,023,744.94

(d) Operation and maintenance collections to June 30, 1927

Total operating and maintenance assessments to date		$346,503.38
Total operating and maintenance collections to date		274,901.96
From Indians		
From white owners	$226,890.05	
From lessees	48,011.91	
Total operating and maintenance delinquencies to date		71,601.52
Total penalties on delinquencies to date		5,214.44

	1924	1925	1926
Operation and maintenance collections:			
On Indian land leased	$6,565.28	$8,089.06	$9,209.08
On white-owned land	17,596.38	28,869.39	24,363.76
Operation and maintenance delinquencies: On white-owned land	45,153.93	42,787.79	61,892.83
Rate of penalty on delinquencies (per cent)	1	1	1

Proof acreage (77,273 acres) is the area used as a basis for computing per-acre operation and maintenance assessments which are made yearly and based on actual cost of the previous year. Assessments are made approximately March first and collections are due April first.

The total expenditures for the calendar year ending December 31st covering each division of the project are submitted to the Department for approval. When these are approved, the Secretary of the Interior fixes the due date and rate.

Collections are made from white owners, lessees, and Indians, who in the opinion of the superintendent, are financially able to pay. In all cases this season, delivery of water has been authorized. Collections are enforced by the withholding of water.

Operation and maintenance assessments are computed each year on the total expenditures for the previous year. A uniform charge for all canals should be made as it seems to be penalizing an allottee for having been allotted under certain canals which have a higher rate.

18. PROJECT DEFECTS, PROBLEMS AND COMPLAINTS

The Dry Gulch Irrigation Co.—The Dry Gulch Irrigation Co. is a corporation operating under the laws of the State of Utah, whose stock is represented by approixmately 53,000 acres lying within the boundaries of the original Uintah Indian Reservation. This company's land is interspersed with project lands which irrigate from the Uintah and Lakefork Rivers.

By virtue of a decree for enlargement dated November 2, 1909, this company acquired a carrying capacity in the Uintah main canal to convey 125 cubic feet of water per second to irrigate lands owned by its stockholders, and in addition to a capacity in the main canal the same decree granted permission to enlarge laterals Nos. 1, 2, and 3 of the Uintah Canal system.

By a decree dated October 30, 1908, this company was given permission to enter upon and enlarge Canal No. 1 to an extent to provide an additional capacity of 260 cubic feet of water per second to water their lands interspersed with project lands under this canal and also a large area lying south of the project lands.

Also, a decree dated in 1910 granted them permission to enlarge Lakefork lateral No. 8 to an extent to provide carrying capacity for approximately 1,300 acres of homestead land lying east of the Lakefork unit of this project.

By right of purchase of about the same date as the decrees the company acquired a carrying capacity in the Bench canal system for the carriage of approximately 23 cubic feet of water per second.

The rights granted this company to enter upon and enlarge the various canals and laterals were exercised and apparently accepted by this department, and the company has been using their capacities since the above-mentioned dates.

It seems during the first years of existence in our canals, and in fact up until the year 1922, an informal working agreement was entered into by officials of this project and officials of the company whereby each party should do what work it thought necessary in maintaining and operating canals, and at the end of the year balance their accounts and make the necessary adjustments, although the decree states specifically that this company should be responsible for repairs, rebuilding and maintaining said canals in the ratio that the amount of said company's water flowing through said canal from year to year stands to the amount of water running through said canals to irrigate project lands. In the year 1922 this method was discontinued and officials of this project assumed complete control of the entire systems as specified in the decree, and maintenance-operation bills were submitted covering their proportionate part as specified in the decrees. This method of settlement apparently did not meet with the approval of the company's officials or stockholders and payment was refused. Since this date a proper basis for settlement has not been arrived at, or at least a basis which was entirely satisfactory to the company.

In the year 1925, Messrs. Engle and Irsfeld representing the Uintah irrigation project and Mr. Woolf, representing the Dry Gulch Irrigation Co., met in Washington and drew up what was thought to be a satisfactory and equitable basis for settlement, but on Mr. Woolf's return the stockholders failed to ratify the agreement, and since that date this controversy has been the subject of voluminous correspondence.

On May 4, 1926, this company submitted a check in the amount of $2,037.61 to apply as payment in full for maintenance charges for the years 1922 and 1923. This amount was accepted as payment to apply on indebtedness. During the year 1927 $8,000 was paid by said company, which also was accepted to apply on accrued charges.

Following is a statement showing the total indebtedness on each canal to date of December 31, 1927, and also credits which were applied:

Bench Canal		$7,257.01
Canal No. 1		25,385.38
Lakefork Canal		3,042.56
Uintah Canal		18,609.53
Total		54,294.48
Less payments made:		
May 4, 1926	$2,037.61	
June 23, 1927	3,000.00	
August 3, 1927	5,000.00	
		10,037.61
		44,256.87
Less 11 per cent penalty on $2,037.61		224.14
Total amount due and unpaid		44,032.73

Suit for collection of this indebtedness should have been instituted long ago. Numerous project water users who apparently are familiar with the situation are unable to see why water should be withheld from their lands on account of non-payment of charges, and the Dry Gulch Irrigation Co. be given extensions of time. It is believed that the Dry Gulch Irrigation Co. fully recognizes the justness of the indebtedness, but are merely delaying in the hope that they will be relieved of paying anything at all, or at least have to pay only an amount which would not represent anything like the actual cost of maintaining and operating the canals.

The Colorado Park Irrigation Co.—Under a decree dated July 9, 1910, permission was given the Colorado Park Irrigation Co. to enter upon and enlarge a small canal which had been constructed by Henry Harris, an Indian, to water his allotments. For a period of several years this department was not billed by the Colorado Park Irrigation Co. for charges covering the maintenance of that part of the ditch through which Henry Harris's water was conveyed. These charges had accrued to date of December 31, 1925, in amount of $1,606.58, payment of which was refused by this department for the reason that it seemed excessive.

During the last few months a conference was held with the officials of the Colorado Park Irrigation Co., when their records were thoroughly investigated, and the amount of the bill has been reduced to $581.30, which includes all charges owing the Colorado Park Irrigation Co. by this department for serving the Indian lands. A temporary agreement has been drawn by the project engineer and signed by the officials of this company fixing the total amount due to date of December 31, 1927, as $581.30, and further recommending a flat rate of 13 cents per acre on the actual acreage of Indian land served through this canal, which acreage at present is 351.2 acres.

An outline of the temporary agreement above mentioned has been submitted to the office for approval and no doubt within the near future will be accepted and a permanent agreement drawn. It is hoped that this matter can be taken care of within a short time and payment made this company in accordance with this agreement.

Transfer of water.—There are a number of tracts of land on this project which have become seeped or waterlogged to such an extent that water can not be used on them beneficially and, in fact, crops can not be grown. There have been numerous applications by white owners who have purchased these tracts to transfer the water rights to homestead lands under the same canal system. The transfer of this water from white-owned Indian lands to homestead tracts would be a very wise thing to do. This of course would mean that the payment of any accrued charges would be made and that the project would immediately begin to derive benefits from the payment of maintenance charges. As these seeped tracts in their present condition need no water, naturally the owner refuses to pay the maintenance charge. The area in each case which has become seeped or waterlogged would not justify providing a drainage system. This matter should be given consideration, and if found practical the project engineer sould be given authority to make application for transfer to the State engineer of the State of Utah. It is understood, of course, that all unpaid charges would necessarily have to be paid before the transfer was permitted.

Uncollected construction charges.—The act of February 14, 1920 (41 Stat. 408), requires that partial payment of construction charges on certain Indian irrigation projects, which includes the Uintah irrigation project, shall be made at the rate of 5 per cent of the per-acre cost as of June 30, 1920, and shall be payable on or before November 15, 1920, and an equal amount shall be paid each year thereafter for 20 years. Circular letter No. 1624a approved by the Secretary of the Interior July 25, 1927, states in part as follows:

"Considerable difficulty has been encountered in collecting charges under these regulations owing to the fact that Indians have been financially unable to pay the charges. In view of these conditions, the regulations governing this matter are hereby modified so as to distribute the unaccrued installments over a period of time so that 2½ per cent of the total amount yet due shall be due and payable on November 15th of each year until further notice."

Said circular letter further states that each sale forwarded to the Indian Office for action shall be accompanied by contract executed on form 1677a, which is a contract requiring the purchaser to pay any and all unpaid construction charges.

Prior to the above act of February 14, 1920 (1 Stat. 408), there were 382 land sales approved, involving a total acreage of 18,740.27 acres. The charges for constructing canals and lateral systems to water this acreage amount to $235,778.09. The matter of collection of the charges on land sales prior to 1920 has been the subject of a great deal of discussion and correspondence, it being held by the ranchers that they were not subject to the construction charges.

Following is a quotation from office letter 44446–27:

"On the Uintah project prior to the act of February 14, 1920, sales were made of allotments containing irrigable lands wherein the advertisements offering such allotments for sale held out to the prospective purchasers that a paid-up water right went with the land. After the enactment of that legislation careful consideration was given to the rights conveyed to such purchasers. An opinion was rendered by the Attorney General September 2, 1921, where a set of facts similar to those on the Uintah project existed with reference to sales on the Wind River, or Shoshone Indian Reservation, in Wyoming. That opinion held that the purchasers acquiring the lands under the advertisements holding out that a paid-up water right went with the land and was included in the sale price, could not be required to pay additional sum for the water right, even though at a subsequent date it was ascertained that amount paid by such purchasers was insufficient to take care of the actual per-acre cost of such right. Instructions therefore were issued December 31, 1924, bearing departmental approval of January 6, 1925, to the then superintendent of the Uintah and Ouray Agency stating that in view of the conditions therein set forth construction charges can not be collected from white purchasers who acquired their lands under advertisements holding out to such prospective purchasers that the purchase price carried with it a paid-up water right. However, in all other cases involving the sale of irrigable land where bids therefor were opened subsequent to May 1, 1920, the purchasers are required to execute a contract and pay their share of the cost of the construction of the project, and all water users are required to pay annual operation and maintenance assessments."

From the foregoing it appears that no attempt should be made to collect from those who purchased their land under the advertisements which held out that a paid-up water right went with each and every tract. The above charges are in the accounts of the project office as uncollected, and specific instructions should be given regarding the collection of this money, and if it is not possible to make the collection, authority should be given to write from the water ledgers the construction charges on all land sold prior to 1920.

Uncollected maintenance and operation charges.—The same condition as above stated exists regarding operation-maintenance charges on the same tracts of land above mentioned. There has been assessed this land for maintenance-operation charges prior to 1920, $108,900.53. Of this amount $68,361.16 has been paid, leaving a balance unpaid of $40,539.37. (These figures may be slightly in error, but they are sufficiently accurate for this purpose.) The reason for this unpaid amount apparently is that if a sale of a tract of land was made in 1917, or in any other year, collections were made only from that date on, which naturally would leave the unpaid amount, as charges have been set up against each acre, beginning with the year 1913.

In addition to the unpaid amounts owed by the white purchasers up until the year 1920, there is a balance unpaid chargeable to Indian lands in the amount of $558,926.60. It is assumed from the advertising that the maintenance charges which accrued prior to the date of purchase, or the date water was first used, can not be collected from the present owner. Definite instructions

regarding this matter should be furnished, and any action which might be taken to relieve the white owners who purchased land prior to 1920, either of construction or maintenance charges, should also apply to Indians; that is, Indian lands should not be susceptible of any charges which accrued prior to 1920.

At present when a land sale is made and the accrued maintenance charges are paid and the contracts executed binding the purchaser to pay the construction charge, the amount received by the Indian for his or her allotment is practically negligible. The average maintenance charge is $13.75 per acre and the average construction charge is $10.20, making a total of $23.95 which is taken into consideration in the purchase of the land. The records show that the average sale price of land is from $25 to $30 per acre net to the Indian.

There has arisen a very perplexing problem regarding the collection of maintenance charges in accordance with departmental order issued February 13, 1928, fixing the rate of maintenance charges per acre on the Uintah Indian irrigation project for the calendar year 1928. Inasmuch as this order states specifically that no water shall be delivered until all maintenance charges have been paid, the question is what charges are due. For example, a case is cited covering land which was patented direct to the Indian and purchased by a white man from him.

William Taylor, allottee 679, was issued patent No. 607769, dated November 13, 1917, covering the SW. 4 SW. 4 sec. 9, T. 2 S., R. 1 E., and the NW. 4 NW. 4 sec. 16, T. 2 S., R. 1 E. The allottee mortgaged this 80-acre tract to the Union Central Life Insuance Co., who foreclosed about the year 1923 and sold to R. M. Smith, who is the present owner, and who has paid charges for the years 1923 to 1927, inclusive. However, there remains a charge of $333.84 covering annual assessments for the years 1918 to 1922, inclusive, which is the amount that apparently should have been collected from the patentee or the Union Central Life Insuance Co.

There is quoted herewith office letter bearing date of November 21, 1924, addressed to Fred A. Gross, former superintendent of the Uintah and Ouray agency, and is in reply to Mr. Gross's letter dated October 21, 1924:

Your letter of October 21, 1924, is at hand.

In accordance with instructions heretofore issued, with a view of requiring purchasers of Indian allotments susceptible of irrigation to pay such irrigation charges, such prospective purchasers are required to execute agreements as provided for in Circular 1677 whereby said purchasers bind themselves to pay the construction and operation and maintenance charges assessed against the lands involved.

The question raised by you relative to the purchase of an allotment from a fee patent Indian involves a little different situation. It is true that there is no lien inserted in the patent covering the land involved providing for the payment of irrigation charges as there is no authority of law authorizing the inclusion of a lien clause in such patents. The regulations issued July 8, 1920, in the form of Circular 1624 provide, however, that irrigation charges in pursuance to existing legislation shall be collected on a per acre basis in 20 annual installments to reimburse the Government and the tribal funds for the cost of the irrigation work. This being true, in those cases where Indians have received fee patents and refuse to pay their proportionate share of such cost, the Government, in pursuance to the provisions of the act of August 1, 1914 (38 Stat. 581), can refuse delivery of water, and this method has successfully been applied in similar cases arising on the Yakima Reservation in Washington.

A fee patent Indian on that reservation refused to pay the irrigation charges and the service refused to furnish him water. He accordingly filed suit to compel the Government to furnish water to his lands. The court decreed that the Government had a right to require such fee patent Indian to execute an agreement providing for the payment of his proportionate share of the cost of the system. It would appear therefore that, based on the decision in this case, ample authority exists for requiring fee patent Indians or their successors in interest to execute agreements providing for payment of their proportionate share of the cost of the irrigation system and for the payment of annual operation and maintenance assessments.

You are accordingly directed to advise the fee patent Indian in question that water will not be furnished until agreement has been executed by the Indian or her successor in interest providing for the payment of the proportionate share of the cost of the system. You will also post in a conspicuous place in the agency office, post office, and such other conspicuous places of advantage notice to this effect. You should also advise the prospective purchaser, if you

know the party, relative to his rights in the matter. The contract provided for in Circular 1677 with slight modification will suffice in cases of this character.

Sincerely yours,

CHAS. H. BURKE, *Commissioner*

From the foregoing letter it appears that the Indian and his successors in interest shall be held responsible for the annual operation-maintenance charges beginning with the first calendar year after the patent to the Indian is approved, or, in other words, the first irrigation season after the patent is approved. Of course, it is possible the patent would be issued in the spring months and water could be used the same year, and it is also possible the patent would be issued in the fall months and water would not be available until the next season.

There are still further complications regarding the collection of maintenance-operation charges on all land sales made under advertisments dated prior to November 21, 1926. This advertisement states in part as follows:

"In addition to the above, the purchaser must also pay all maintenance assessments that have accrued against the land, the approximate amount of which will be found listed opposite each tract of land advertised. These accrued maintenance charges are due in advance and if not paid within 30 days of acceptance of sale of Indian-owned land, the sale will be cancelled and the initial payment forfeited to the owner of the land."

This is the first advertisment issued under which sales were made that carried a clause specifically stating that the purchaser should pay all accrued charges. The advertisements covering sales prior to this stated that annual maintenance charges should be paid, but made no mention of the accrued charges.

In issuing the bills for the calendar year 1928, we billed some of those who purchased their land under the advertisements which did not state that the accrued maintenance charges should be paid, and needless to say, we have had numerous complaints and all have refused to pay, quoting for their authority the advertisment which stated only that they should pay the annual charges, which they have done. However, it is noted that purchasers of Indians since May 1, 1920, have executed an agreement embodied in Circular 1677a wherein they agree to pay all accrued irrigation assessments. The following is quoted from this circular:

"Now, therefore, in consideration of the premises and the sum of one dollar in hand paid, it is mutually agreed that in addition to the covenants contained in the contract of purchase which is annexed hereto and made a part hereof, I (James H. Smith), will pay on a per acre basis all irrigation charges assessed or to be assessed against this land, including accrued assessments, which accrued assessments shall be paid prior to approval of this sale; and agree to pay said construction, operation, and maintenance assessments on the due dates each year; and further covenant and agree, should any part of said land not now irrigated, at a subsequent date be brought within an Indian irrigation project, to pay all irrigation assessments against the lands when so assessed, in the same manner as if the lands were now under constructed irrigation works."

Inasmuch as departmental order fixing the rates for the calendar year 1928 states that all charges shall be paid, there should be a decision as to what all charges would be under the above mentioned advertisements.

Effect of storage on Indian water rights.—The Dry Gulch Irrigation Co. has made filings with the State engineer of Utah on practically every lake lying in the water sheds of the Lakefork and Uintah Rivers. In most cases some construction work has been done in an attempt to secure an additional water supply for this company's lands as their filings are secondary to the Indian filings and are not sufficient to meet the demands. This company does not propose to increase their supply of water by impounding a greater amount in these lakes, but by merely tapping the lake and draining off the natural storage. It would seem permissible for this company to increase the capacity of these lakes and use the additional amount impounded to supplement their supply, but it would hardly seem permissible to tap these lakes and lower the water level, which surely would have an effect on the late discharge of the rivers, of which these lakes would be considered the natural feeders.

This is a matter which has been the subject of several lengthy reports and which should be given consideration. Any work done or any amounts which have been drawn from these lakes so far has not affected the water supply for the Indian lands, but it is possible that in the future when all Indian lands are irrigated that this might be a matter of importance.

Yanawards Canal.—The Yanawards Canal was constructed by the United States Indian Irrigation Service from reimbursable funds for the purpose of diverting water from the Duchesne River to irrigate several Indian allotments

and a portion of the townsite of Duchesne. This canal was constructed during the period July to November, 1908.

The Indian allotments all passed into white ownership prior to the year 1920 and apparently would not be subject to the construction charge. The maintenance-operation and construction charges, which total $7,245.02, have not been segregated in a way that it would be possible to tell at present the total amount of construction charges and the total amount of operation-maintenance charges. This canal system has been operated by the ranchers since about the year 1917 and no money has been expended by this project in maintaining and operating this canal, and in fact, no attention has been given it. The ranchers are now desirous of entering into a formal agreement taking over this system and releasing the Government from further supervision. Since the land is all owned by white men, the proper action would seem to formally turn the system over to the water users, providing they make the necessary adjustment in the accrued charges and release the project from further supervision or responsibility.

Delinquent white-owned lands.—There are 46 tracts of land on the project which have been purchased by white owners who for various reasons have not paid their operation-maintenance assessments. The total indebtedness on these tracts, representing 1,633.50 acres, is $14,826.45. This land was purchased through land sales by people from various parts of the country probably with the intention of holding it until the price increased, or in other words, for an investment. Their dreams, apparently, did not materialize and they are still the owners of the land. Other tracts are owned by local people and have become seeped to such an extent that they are worthless.

In view of the fact that these uncollected bills make a bad showing on the water ledgers, it is believed that some action should be taken either toward the collection or releasing of the above stated amount from the records. Definite information can be furnished on each tract, if necessary.

Uintah—Canal No. 1 connection.—In the construction of this project, as stated under general plan, it was thought advisable to divide the project into a number of units and make a diversion for each separate unit. This arrangement or plan has proved very good and is not criticized. However, there is one exception which could rightfully be taken to this general plan and that is in the case of the Uintah Canal and Canal No. 1.

These canals have different points of diversion, but are covered by the same filing. The acreage under the diversion of the Uintah canal is 5,844.37 and the acreage under Canal No. 1 is 3,525.25 acres. The topography of the country between these two canals, which are approximately three miles distant, would make it possible to divert water for the land under Canal No. 1 at the diversion point of the Uintah Canal and carry the same down Uintah Canal a distance of approximately three miles, thence southeast to a point on Canal No. 1 where the first water is diverted for land which is now being served by the diversion of Canal No. 1. There is ample capacity in the Uintah Canal without enlargement to make this change. Lateral No. 1 of the Uintah system would necessarily have to be enlarged to carry an additional 50 second-feet of water.

A survey has been made of this proposed change and it is estimated that it would not cost to exceed $1,500. The advantage in making such a change is that under the present conditions it is necessary to maintain two separate diversions in the Uintah River. The present diversion of Canal No. 1, which would be eliminated by this change, is in very poor repair and within the next two years it will be necessary to construct a new diversion gate, which probably will cost $2,000. Therefore a saving of approximately $500 would be made.

In addition to the replacement of the headgate, each year it is necessary to expend from $100 to $500 in construction of brush and rock dams in the Uintah River to get water to the diversion gate of Canal No. 1. By making the proposed change, the expense of the construction of a new diversion gate would be eliminated and the continuous expense each year of placing rock cribs and brush dams to get water to the diversion would be eliminated.

Further, by the proposed change this project would not be interested in Canal No. 1 at all, which would be a commendable feature, inasmuch as the Dry Gulch Irrigation Co. has an enlargement in this canal of 260 second-feet capacity covering 18,200 acres. It is readily seen that this company will insist on having a voice in the management of this canal in the same proportion as their acreage bears to the Indian land, which is a feature which should not be overlooked.

White River allotments.—There have been allotted to the Uncompahgre Indians approximately 10,000 acres of land which are susceptible of irrigation lying along the White and Green Rivers in townships 8 and 9 south, ranges 20 and 21 east. The irrigation of this land has been the subject of a great deal of correspondence

and a report by W. H. Means, superintendent of irrigation, dated February 19, 1912, which report was not very favorable. It also cited the opinion of former Chief Engineer Code, who visited the ground several times, that it would be unwise to expend the necessary funds for the construction of this ditch.

Basing an estimate on the other units of the project, it would cost approximately $20 per acre to construct the main canal and lateral system, which would include the diversion gate and other structures necessary, but would not include the cost of a control structure or dam in the White River. An intelligent estimate could not be made on this without making soundings to determine the type of structure that would be required, and no funds are available for this kind of work.

This unit could not be recommended from the standpoint of an investment, but it does seem something should be done for the Indians who were allotted these lands, as the land, other than a small amount of pasture land which lies adjacent to the White River, is or absolutely no value to the Indians. Either it should be watered, regardless of the investment, or land should be purchased elsewhere and the Indians moved to a location where it would be possible for them to become self-supporting. It might be, after a soil survey had been made and the cost of clearing and leveling the land had been taken into consideration, that this unit would be feasible, providing the Indians were given the necessary assistance to start them off, but it certainly would not seem advisable to make any expenditures in building an elaborate canal and lateral system and turn the Indians loose to rustle for themselves without any financial backing, as very few of the Indians on this unit would be financially able to develop their allotments to a point that they would be of any value.

The Uintah project was constructed at a very low per-acre cost ($10.20). While the development has not been as rapid as probably was expected, it is no doubt due to the lack of transportation and the remoteness from any large city. The Victory Highway, which is now under construction, with probabilities of completion within the next three to five years, should make a big change for the progress and development of the project.

There is invested in this project a total of $2,328,588.83, which is producing crops valued at approximately $1,000,000 annually, which is a very good investment for the ranchers. However, there is expended annually an average of $63,000 for operation-maintenance purposes. During the fiscal year 1927, $43,000 was collected, which indicates that the project is not self-supporting and will not be until each acre pays its proportionate part. Trust patent Indian land is assessed its proportionate part, but collections are not made or placed at the disposal of the project from land which is not under lease.

From the amount of collections and the amount expended, it would seem imperative that each year $20,000 should be appropriated to defray expenses of maintaining the system to water the trust patent land, and it is recommended that efforts be made to secure this amount.

It is recommended that the controversy between this project and the Dry Gulch Irrigation Co. in regard to their indebtedness be considered. It seems it might be advisable to have a committee meet with the committee appointed by the Dry Gulch Irrigation Co. to discuss some plan of settlement. This, of course, has been done, with very poor results, but we believe at present something might be accomplished by a meeting of this kind. At least, it would be giving them one more chance, and would probably cause a better feeling and make it more agreeable for the officials of this project. However, in case an agreement can not be reached, certainly this matter should be placed in the proper channels for collection.

The proposed change of the diversion point of Canal No. 1 should be considered. The cost of this change is rightfully a construction charge, but inasmuch as some of the land under Canal No. 1 was sold under the advertisement which set forth that a paid-up water right was transferred with the land, and therefore construction charges can not be collected, it would seem the only way to handle this is to have all of the above-mentioned owners sign a contract agreeing to pay their proportionate part of these charges. If this can not be done, the alternative would be to make a maintenance-operation charge of it. It is recommended that authority be granted for this change.

There are a number of allotments within the boundary of this project which have not a water right on account of failure to make proof of beneficial use as required by the State of Utah. There are also a greater number on the outside of the project which have not a water right. Filings were made for some of these allotments and proof of beneficial use was not made. Therefore the filing has elapsed. These tracts are scattered over the entire project and reservation, the largest group of which is known as the White River allotments, situated on the

White River just east of Curay. By all means a water right should be secured for these allotments and it is recommended that the necessary action be taken to secure an appropriation of $5,000 to cover expenses of making the necessary surveys and filings.

In allotting the Indians on this reservation, and especially within the boundaries of the project, it is supposed that an effort was made to allot the Indians the most valuable lands, but it is the opinion of the advisors that the Indians were actually allotted some of the most worthless land on the reservation, while some of the very best land was opened to entry and has since been homesteaded.

The 87,000 acres which are within the boundaries of this project are scattered over an area 33 miles in width and 26 miles in length. The largest body of this land under one canal system is 11,425 acres, which is under the Lakefork Canal. The fact that these allotments are scattered over such a large area makes it almost impossible to give the Indians the required attention and service, which they should have to develop them along agricultural lines. Further, some of the lands which were allotted the Indians are absolutely worthless and should never have been included in an irrigation project, except as pasture land. The soil on a great number will not average three inches in depth and is underlaid by a subsoil of coarse gravel. Therefore it is respectfully recommended that the feasibility of purchasing some homestead land which is suitable for farming, and allotting it be considered.

If it were possible to effect an arrangement of this kind quite a number of the isolated allotments could be disposed of and the project made more compact. In fact, it is believed that two or three, if not more of the present units of this project could be turned over to the white owners, and a contract executed whereby they would pay any charges which have been or will be assessed against the land, providing it be scattered over a long period of time.

If some arrangement similar to this can not be had, it is probable that a greater part of the operation-maintenance charges which are accruing and also the construction charges will never be collected. The only means of forcing these collections at present is to withhold water from the allotments, and this is not very effective on a tract of rocky land which is not suitable for farming and is seeped to such an extent that there is ample water to produce pasture; and as the canals and laterals naturally run through the allotments, there is plenty of water for stock.

If this arrangement is found to be feasible and should be recommended, it would require the services of a special committee to make an extensive report on this one subject. This proposition might prove rather expensive, but as it is, there are numerous allottees who have not been benefited by this project, although their land has been assessed construction charges and maintenance charges each year since 1915, and the total of these charges which must be paid is so great that even though a sale is made the allottee in reality does not receive anything for his or her allotment.

With reference to the effects of storage on Indian water rights, while the draining of these lakes may not materially affect the Indian water right at present, and possibly will not for several years to come, it is respectfully recommended that formal protest be entered against the lowering of the original water surface of these natural reservoirs.

Irrigation on Walker River Reservation, Nevada

1. RECOMMENDATIONS

It is respectfully recommended:

1. That $15,000 be provided for making a topographic survey, a soil survey and classification of all irrigable lands, and for the preparation of plans and estimates looking to the completion of this project, including the Rio Vista Dam.

2. That efforts be made to secure an appropriation for the construction of Rio Vista Dam.

3. That upon completion of the adjudication suit now in progress, and after authorization and appropriation for construction of the project, including the Rio Vista Dam, all deceased or inherited Indian land be sold, provision being made for the collection of irrigation costs from the purchasers.

4. That the irrigation charges, except as provided in the following recommendations, be made a lien against Indian-owned land, but inoperative so long as the land is in Indian ownership.

5. That lands heretofore irrigated, and now owned by Indians, and not exceeding the acreage that Walker River would normally serve were there no upstream diversions, shall not be assessed any part of the cost of the Rio Vista Dam.

2. SYNOPSIS

The Walker River Reservation was set aside for "Indian purposes" by the Commissioner of the General Land Office on December 8, 1859, and was formally made a reservation by Executive order of March 19, 1874. The reservation originally contained 520,000 acres, but was reduced to approximately 50,000 acres by Executive order of September 26, 1906, based on an agreement with the Indians. Later, approximately 25,000 acres of grazing land (the status of which is still in doubt) were added to the reservation, making a total of about 85,500 acres now in the reservation.

The reservation is in west-central Nevada, in the lower part of the Walker River Basin, and is about 24 miles long, with an average width of 4 miles. The southern boundary is Walker Lake. The agricultural lands consist of approximately 12,000 acres of river bottom land, 10,278 of which are classed as irrigable.

Transportation and markets.—The Tonopah-Goldfield branch of the Southern Pacific Railroad follows the Walker River through the reservation, and none of the agricultural land is more than 7 miles from either Shurz or Rio Vista, the two railroad stations within the reservation. The Bonanza Highway—now under construction—practically follows the railroad. The principal markets for produce are the mining camps to the south.

Allotments.—Allotments were first made in 1906. There are now 495 trust patent allotments of 20 acres each, and 9 allottees have received fee patents. One of these has sold his land. All allotments are classed as irrigable.

Population and health.—The white population is 39, mostly Government and railroad employees. The Indian population is 501 Paiutes. There are 96 families, 90 of which live in permanent homes. There are 115 cases of tuberculosis and 45 of trachoma.

Climate.—Range in altitude 4,050 to 4,250. Maximum temperature, 106°; minimum, 17 below zero. Average yearly precipitation 5.12 inches. Length of growing season 146 days.

Soil and drainage.—No soil survey has been made. All soils were deposited as silt by the annual overflow of the river. The land near Walker Lake has been termed delta soil, but has been partly formed by the recession of the lake shore. These lands farthest from the river are usually black adobe and generally contain a small amount of alkali. These lands—a very small percentage of the total—will eventually need drainage. The balance of the land, a fine, sandy loam, is free from any drainage problem. The native vegetation is sagebrush.

Water supply and water rights.—The water rights of this reservation have not been determined, but are now in process of adjudication in the Federal court, district of Nevada. The Government is asking for 150 second-feet of water for 10,000 acres of land with a priority of 1859. It bases its claim on the "Winters case" (148 Fed. 684–1906). This amount of water is sufficient for all land, but is considerably more than the uncontrolled flow of Walker River (even though all upstream development were blotted out) would safely yield during the irrigation season. The construction of the proposed Rio Vista Reservoir, estimated cost $300,000, would completely solve all water-supply problems.

General plan of irrigation development and summary of project works.—An irrigation system has been built for the Walker Lake Valley, the lower unit, to serve 7,500 acres, but has been only partly completed. At present 3,600 acres can be served, of which 2,000 acres are irrigated. A diversion dam, located 6 miles northwest of the agency, a main canal on each side of the river, 7 miles and 10 miles in length, respectively, and a total of 13 miles of laterals have been built to date. A small amount of work extending the lateral system would complete this unit. The upper, or Campbell Valley, has no irrigation works. It is proposed to develop this after the lower unit is completely developed. The reservation has no storage reservoirs.

Utilization of land.—Out of the 3,600 acres of irrigable land, 2,000 are now irrigated; 1,500 acres are intensively cultivated, the balance representing pasture and temporarily abandoned land. With the exception of 21 acres of white owned land, all land is farmed by 92 Indian families, or 16.1 acres per family.

Principal crops and yields.—The principal crops grown (1927) were: 800 acres of alfalfa, average yield 2.3 tons, or $33.60 per acre; 265 acres of wheat, average yield 8.63 bushels, returns averaging $10.79 per acre; 41 acres of potatoes were planted and were almost a total failure. This was caused by the excess use of water and accounts largely for the poor showing with wheat; that, and poor farming in general. Good farmers raise from 8 to 12 tons of potatoes and the average price the past four seasons was $42 per ton. Use of excessive quantities of water is the result of frequent water shortages. In continual anticipation of water shortage, the Indians use excess water when they have it.

Construction costs and collections.—To June 30, 1927, the total construction costs were $136,019.70, or $37.75 per irrigable acre. With the total estimated area of 10,278 acres brought under cultivation, together with the construction of the proposed Rio Vista Reservoir, the per acre cost is estimated to be $52.50, or a total of $540,000. Drainage may add $10 to $15 per acre. Of the above construction costs, $7,293.77 were nonreimbursable.

No collections have been made, as the Indians are financially unable to pay.

Operation and maintenance costs and collections.—To December 31, 1927, $66,528.80 had been expended, of which $3,180.91 are tribal or nonreimbursable funds. The total operation and maintenance for the area under constructed works is $18.48 per acre.

No attempt has been made to collect operation and maintenance charges from Indians for the reason before given, but the matter of making collections from future lessees and white owners was recently taken up with the department. Operation and maintenance charges for the season of 1927 were $6,372, or $1.77 per acre for the area under constructed works. This cost is much higher than normal and is due to the fact that large amounts were written off for worn-out equipment and property condemned. An operation and maintenance charge of $.130 per acre would give sufficient revenue to operate the project at present, which figure could be reduced as the irrigable area increased, but is not likely to be less than $1.00 per acre when fully developed.

Deceased allotments.—Of the 504 allotments made since 1906, 241 are inherited land or deceased Indian allotments. It is difficult to do anything with this land, as the heirs seldom can agree on any plan of working it. With over 48 per cent of the land in this status we are confronted with a rather serious problem and this, along with the numerous water shortages, accounts for the very slow growth of the project. Some of the land may be utilized by leasing, but this is difficult in this State where good land sells at a low price. Unimproved land would be very difficult to lease and it is recommended that all allotments of deceased Indians not now farmed be sold.

3. DIGEST OF LEGISLATION, TREATIES, AND EXECUTIVE ORDERS

Act May 27, 1902 (32 Stat. 260).—That the Secretary of the Interior be, and he is hereby, directed to allot from the land on the Walker River Reservation in Nevada susceptible of irrigation by the present ditches or extensions thereof, 20 acres to each head of a family residing on said reservation, the remainder of such irrigable land to be allotted to such Indians on said reservation as the Secretary of the Interior may designate, not exceeding 20 acres each; and when a majority of the heads of families on said reservation shall have accepted such allotments and consented to the relinquishment of the right of occupancy to land on said reservation which can not be irrigated from existing ditches and extensions thereof and land which is not necessary for dwellings, school buildings, or habitation for the members of said tribe, such allottees who are heads of families shall receive the sum of $300 each to enable them to commence the business of agriculture, to be paid in such manner and at such times as may be agreed upon between such allottees and the Secretary of the Interior. * * *.

Joint resolution June 19, 1902 (32 Stat. 744).—In addition to the allotment in severalty of lands in the Walker River Indian Reservation in the State of Nevada, the Secretary of the Interior shall, before any of said lands are opened to disposition under any public-land law, select and set apart for the use in common of the Indians of that reservation such an amount of nonirrigable grazing lands therein at one or more places as will subserve the reasonable requirements of said Indians for the grazing of livestock.

For the construction, repair, and maintenance of irrigation systems, and for purchase or rental of irrigation tools and appliances, water rights, ditches, and lands necessary for irrigation purposes for Indian reservations and allotments; for operation of irrigation systems or appurtenances thereto, when no other funds are applicable or available for the purpose; for drainage and protection of irrigable lands for damage by floods or loss of water rights, upon the Indian irrigation projects named below:

Under the foregoing heading the acts of May 25, 1918 (40 Stat. 562), and June 30, 1919 (41 Stat. 3), provided $6,800 and $8,500, respectively, for irrigation work on the Walker River Reservation.

Act February 14, 1920 (41 Stat. 408).—General irrigation item; provided $9,285, reimbursable, for the maintenance, operation, and construction of irrigation systems on the Walker River Reservation.

Act March 3, 1921 (41 Stat. 1225).—General irrigation item; provided $8,000, reimbursable, for the maintenance, operation, and construction of irrigation systems on the Walker River Reservation.

Act August 24, 1922 (42 Stat. 559–60).—General irrigation item; provided $5,000, reimbursable, for operation, maintenance, and construction of irrigation systems on the Walker River Reservation.

Act January 24, 1923 (42 Stat. 1174).—General irrigation item; provided $5,000, reimbursable, for operation, maintenance, and construction of irrigation systems on the Walker River Reservation.

Act June 5, 1924 (43 Stat. 390).—General irrigation item; provided $5,000, reimbursable, for operation, maintenance, and construction of irrigation systems on the Walker River Reservation.

Act March 3, 1925 (43 Stat. 1146).—General irrigation item; provided $5,000, reimbursable, for operation, maintenance, and construction of irrigation systems on the Walker River Reservation.

Act May 10, 1926 (44 Stat. 458).—General irrigation item; provided $4,500, reimbursable, for operation, maintenance, and construction of irrigation systems on the Walker River Reservation.

Act January 12, 1927 (44 Stat. 934).—General irrigation item; provided $4,500, reimbursable, for operation, maintenance, and construction of irrigation systems on the Walker River Reservation.

4. HISTORY

The first step taken toward the establishment of this reservation was the letter of Indian Agent Frederick Dodge to the Commissioner of Indian Affairs, dated November 25, 1859. The letter inclosed a map showing the boundaries of the proposed Walker River and Pyramid Lake Reservations and recommended that they be set aside for Indian purposes. In a letter to the Commissioner of the General Land Office dated November 29, 1859, the Commissioner of Indian Affairs requested that the land as described in Dodge's letter be respected as Indian reservations. Under date of December 8, 1859, in a letter to the surveyor general of Utah Territory the Commissioner of the General Land Office directed that the tract of land as described by Dodge be set aside as Indian reservations when the public-land surveys were made.

Under date of July 13, 1861, Indian Agent Wasson, in a letter to Territorial Governor Nye, ex-officio Indian agent, reported the construction of office, residence, and other buildings. These buildings were located in Campbell Valley, about one-half mile above the site of the proposed Rio Vista Dam on the north bank of the river. This was recently established in examination of old maps.

Governor Nye, in a letter to the Secretary of the Interior dated July 19, 1861, referring to the Overland Mail Co. cutting hay on the reservation, recommended the purchase of agricultural implements, cows, mares, etc. He stated that the number of Indians in the Territory at that time was 10,000.

On June 9, 1865, Mr. Campbell, the farmer in charge, in reporting to the commissioner the condition of the hay crop, stated that there were 250 to 300 tons scattered along the river for 15 miles; that the Indians were capable of civilization and anxious to cultivate their land. He also reported that the whites at that time were complaining about the reservation remaining idle and took steps to have it opened for settlement, stating the valley was most favorable for grazing.

On May 29, 1866, Agent Campbell reported the conditions of farming on Walker River as follows: Had 3 acres plowed and seeded to potatoes, corn, beans, etc.; had dug ditch 1,000 yards long. This was probably the first irrigation practiced on the Walker River Reservation, all previous efforts being in the nature of grazing or the cutting of wild hay, which received its water from the annual overflow of the river. This also marked the beginning of the construction of what became known as the Campbell ditch and was eventually built for a distance of 3 miles and 350 acres were irrigated under it at one time.

On May 8, 1871 agent C. A. Bateman visited Walker River and recommended that the present project (Campbell Valley) be abandoned and that a new ditch and dam be constructed about 5 miles from the mouth of river, because this ditch could be made to serve "15,200 acres of land"; was nearer the fishing grounds and had timber on the land. He reported that a crew was being organized to start the construction of the ditch and dam.

The next season it was reported that 100 acres were planted to wheat and 150 bushels of potatoes raised and 150 tons of hay cut. Therefore it appears that the year 1872 marked the beginning of irrigation in the Walker Lake Valley, the location of the present project. Farming was carried on in Campbell Valley

several years after the start of farming in Walker Lake Valley. Agency headquarters remained in Campbell Valley for several years, but were moved to the lower valley about 1876 in section, township 13 North range 28 East and to the present location about 1883. The irrigated acreage in 1872 was estimated at 150 acres.

On March 19, 1874, Walker River was formally made a reservation by Executive order.

The report of farmer L. A. Ellis in 1899 shows 1,300 acres in cultivation. The first report of irrigation possibilities of the Walker River Reservation was made by Superintendent of Irrigation Butler in 1901. In 1902 a wooden diversion dam was built by engineer W. W. Coleman

By the act of May 27, 1902, Congress directed the Secretary of the Interior to allot the land of Walker River Reservation and under the act of July 24, 1905, an appropriation was made available to enlarge and extend ditch No. 2 at a cost of not to exceed $50,000. W. E. Casson, special allotting agent, completed the allotment of the Walker River Indians on July 24, 1906. The proclamation of the President dated September 26, 1906, formally opened the relinquished land to settlement. This is the order that reduced the reservation from 320,000 to 85,760 acres.

Surveys were made in 1906 by engineer E. E. Jones which led to the active construction of the major part of the present irrigation system and was carried on until the year 1910.

The "Weber" reservoir site was a subject of the report by engineer J. A. Beemer of January, 1919, and again in March, 1920. Drainage studies were made of the lower Mason Valley by engineer Beemer and a report submitted thereon on May 20, 1919. Engineer Beemer also made a preliminary survey in May, 1920, of a drain ditch in Mason Valley as a possible source of late season water supply.

On July 3, 1924, a suit was brought against the white water users by the Government. It was reported that there was a severe water shortage that season. In 1925 surveys of the irrigable areas were made for use in the water adjudication suit. During the latter part of 1926 and the first part of 1927 surveys, tests, and report were made as to the feasibility of the Rio Vista Reservoir site. A report by Engineer W. N. Blomgren indicates that 1926 was a year of severe water shortage.

5. LOCATION, TRANSPORTATION, AND MARKETS

The Walker River project is located in Lyon and Mineral Counties in western Nevada. It is served by the Tonopah and Goldfield Branch of the Southern Pacific Railroad, who acquired the original Colorado and Carson narrow-gage road by purchase. This branch will eventually be a part of the Los Angeles-Portland, Oregon main line which the Southern Pacific contemplates building. This company is now actively engaged in completing the "cut-off" from Wendel, Calif., to Klamath Falls, Oreg. When completed will leave but 180 miles of narrow-gauge road to be changed to broad gauge to make the complete through route.

This project has had an excellent market at all times in the rich mining camps in the southern part of the State. These camps, of course, will eventually be worked out and it will be necessary to rely largely on the more distant Los Angeles and San Francisco markets, although the local markets always will be a considerable factor. The Indians have a free freight rate to the southern Nevada mining camps.

6. RESERVATION LAND AND ALLOTMENTS

(a) *Area, classification, and estimated value*

Classification	Acres	Acre value	Total value
Irrigable area (includes allotments)	[1] 10,280	$10	$102,280
Timber land, fuel only	3,360	25	84,000
Grazing and waste land	72,080	1	72,080
Homestead land in project	40	10	400
Estimated area of reservation	[2] 85,760		285,760

[1] Irrigable area of reservation is estimated at 12,000, but only 10,280 acres are in the irrigation project.
[2] Some doubt as to status of grazing reserves set aside by Executive order; original reservation contains approximately 52,431 acres of which 3,360 acres are timber reserve.

(*b*) *Allotments.*—Allotments were begun in 1906. To date 504 allotments of 20 acres each, totaling 10,280 acres, have been made. The allotments are all classified as agricultural. Of these allotments, 495 are held under trust and 9 under fee patents. One fee patent Indian has sold his allotment. The allotments of six deceased Indians have been sold; five to Indians and one to whites. No Indians are without land because of sales.

7. POPULATION AND HEALTH CONDITIONS

(*a*) *Indians*

Tribe: Paiute. Population of reservation, 501.
Indians (full-blood), 462; mixed, 39.
Families on reservation, 90.[1]
Families on Government project, 75.[1]
Cases of tuberculosis, 115.[1]
Cases of trachoma, 45.[1]
Indian births (1926), 2.
Indian deaths (1926), 11.
Increase in population (1920–1926), 18.
Indian families living in permanent homes, 90.[1]
Indians receiving rations (1926), 24.

(*b*) *Whites*

Whites on reservation, 39.
Non-Indian families on Government project, 12.
Landowners, 1; lessees, 3.

8. CLIMATE

The average yearly rainfall on the project is 5.12 inches, of which 2.45 inches falls during the irrigation season. The average yearly total snowfall is less than 6 inches.

Extremes of temperatures are as follows:
Maximum, 105°; minimum, −17°.
Average yearly range, 103°.
Average maximum, 101.2°; minimum, −1.8.
Average yearly mean, 49.9°.
Average maximum during growing season, 92.5.
Average minimum during growing season, 32.7.
Average mean during growing season, 62.3.
Average date last killing frost in spring, May 10.
Average date last killing frost in fall, September 15.
Average growing season, 146 days.
Yearly percentage of sunshine, 85.
Average percentage of sunshine growing season, 98.

9. TOPOGRAPHY, SOIL AND DRAINAGE

(*a*) *Topography.*—Some topography has been taken of land near Walker Lake by transit-stadia method but because of large interval and the three different datum used, maps are of little value. In general, the slope of the ground is uniform and of sufficient extent to afford good drainage. Only a very small percentage of the land is affected by isolated ridges or depressions. The range of elevations are: Walker Lake, 4,054 to irrigable land near Campbell diversion dam 4,250; distance 24 miles. Average slope 8 feet per mile; minimum 5 feet; maximum 20 feet per mile. Minimum cost of clearing land $30 per acre; maximum $100; average $50 to $60.

Water is distributed on a continuous flow basis during periods of ample supply; on rotation schedule during water shortages. Range in duties are 1.8 to 6 acre-feet with an average of 3 acre-feet per season on the land. Irrigation basin or border-check system of irrigation is used.

(*b*) *Soil.*—No soil survey has been made. All soils have been deposited by the river in its annual overflow and are of good, uniform fertility. They range in texture from the heavy, black adobe to the lightest of Lahontan sandy loams. Depth 6 to 20 feet observed.

The three principal crops grown are alfalfa, grain, and potatoes, with average yields of 3 tons, 1 ton and 6 tons, respectively, by the better farmers. The prin-

[1] Estimates.

cipal native vegetation is sage brush, 2 to 6 feet high; rabbit brush, 3 to 4 feet high; greasewood, 18 inches to 2 feet in height. There are also some willows and buck brush and considerable cottonwood timber up to 4 feet in diameter.

(*c*) *Drainage.*—Drainage has presented no problem to date. The deep river channel in the center of the narrow valleys forms an ideal drain. As the project develops a few isolated depressions or "pot-holes" may need drainage. One and two-tenth miles of waste ditch (called drain No. 1) has been built to collect waste waters from laterals 2B and 2C. This is only 3 feet deep, 3-foot bottom, with a capacity of about 10 second-feet. No other drainage work has been done.

10. WATER SUPPLY AND WATER RIGHTS

(*a*) *Water supply.*—The water supply for this project is furnished by the Walker River entirely. The average elevation of the drainage basin is 6,000 feet and area above Schurz is 2,800 square miles. Of the above drainage area 550 square miles furnishes over 90 per cent of the run-off. No storage is available for the project. Upper water users have developed a total of 100,000 acre-feet of storage.

No data is available on the amount of water that is applied to land. In general, the project water supply is poor even for the present limited acreage, being under the control of the upper water users at all times, except short periods of flood flow. In the event the entire project is developed it is doubtful if the minimum flow of the river will furnish an adequate supply. In certain short years there is no question that the supply would be very short and to supply the entire 10,000 acres from the natural flow would work a hardship on the upper users. The proposed Rio Vista Reservoir would furnish an adequate supply (30,000 acre-feet, estimated cost, $300,000) at all times and there is an ample winter and flood flow to fill it each year.

(*b*) *Water rights.*—This project has no adjudicated water right nor any completed certificates of beneficial use. The waters of the Walker River have been adjudicated in the Federal court, district of Nevada, in decree No. 731, entitled "Pacific Live Stock Co. *v.* T. B. Rickey, et al." The Government was not a party to this suit, consequently the water rights of the Indian lands were not determined.

The project bases its water rights on a decision of the Supreme Court of the United States commonly called the Winters case. The Government instituted a sut against all the upper water users on July 3, 1924, to determine the water rights of the stream. This suit is now pending.

(*c*) *Project diversions*

	1924	1925	1926	1927
Acre-feet for season	3,238	11,688	9,938	17,582
Acres irrigated	1,832	1,630	1,809	1,660
Acre-feet per acre	1.7	7.0	5.4	10.5
Average second-feet:				
April	17	19	38	41
May	36	30	56	58.5
June	4.3	18	37.9	49.8
July	0	43	21	59.8
August	0	37	1.5	45.5
September	0	29	0	41

For the years 1922 and 1923 there is no data except that the supply was ample all season.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

This project contemplates the irrigation of 10,280 acres of Indian land within the reservation at an estimated cost of $540,000, including cost of proposed Rio Vista Reservoir. Rio Vista Reservoir is estimated to cost $300,000, capacity of 30,000 acre-feet. This feature of the project has not been approved for construction.

The project consists of two divisions: Campbell Valley, approximately 3,000 acres, and Walker Lake Valley with 7,500 acres. The land in the Campbell division has been allotted, but to date no irrigation system has been built, which is estimated to cost $45,000 without storage.

Walker Lake division has a partially constructed irrigation system consisting of a diversion dam; a main canal on each side of the river with a capacity of 50

second-feet for No. 1 and 150 for No. 2 canal. Canal No. 1 system is 90 per cent complete. No 2 canal is complete, but the lateral system is only 50 per cent complete. Estimated cost of Walker Lake division is $205,000 (without storage), of which amount $136,800 has been spent to date.

12. SUMMARY OF PROJECT WORKS

(*a*) *Storage.*—No storage structures have been built to date.

(*b*) *Distributing structures*

Main canal headgates (concrete)	2
Sublateral headgates (concrete)	6
Sublateral headgates (wood)	2
Combined checks and turnouts (concrete)	9
Spillways (concrete)	2
Lateral headgates (concrete)	4
Lateral headgates (wood)	3
Farm turnouts (concrete)	30
Farm turnouts (wood)	4
Farm turnouts (steel)	5
Drops (concrete)	4
Flumes (concrete)	2
Flumes (steel)	1
Miscellaneous structures, syphons, division boxes, etc. (concrete)	7

(*c*) *Canals and laterals*

Capacity, 100 to 250 second-feet (miles)	[1] 5
Capacity, 50 to 100 second-feet (miles)	[1] 4
Capacity, 15 to 50 second-feet (miles)	[1] 16
Capacity less than 15 second-feet (miles)	[1] 5
Total	30

(*d*) *Drains.*—Capacity 10 second-feet, 1.2 miles.

(*e*) *Levees.*—Average height 4 feet, length 1,200 feet.

(*f*) *Buildings.*—One wood residence; one wood office and garage building and one corrugated iron warehouse.

(*g*) *Telephone lines.*—Three stations; length one-fourth mile (connects with Bell system).

130. AREA AND UTILIZATION OF IRRIGABLE LANDS

(*a*) *Utilization of Government project lands*

	1924	1925	1926
Acreage arable	10,278	10,278	10,278
Acreage irrigable (present project)	3,600	3,600	3,600
Acreage irrigated	1,832	1,630	1,809
Acreage cultivated	1,532	1,500	1,509
Total crop value	$24,894	$58,480	$40,511
Average acre-crop value	$16.26	$39.00	$26.18
Indians farming	82	90	92
Lessees farming			1
White owners farming	2	2	2

(*b*) *Utilization of land owned by Indians and leased.*—There are but 25 acres owned by non-Indians; 5 acres by missionary society for church grounds, and 20 acres by the trader, bought as a business location. Also there was only one lessor (20 acres) during the 3-year period.

[1] Approximate.

14. Principal crops, crop yields and returns

Crop	Average yield per acre	Acreage	Average price per unit	Average value per acre	Total value
(a) Entire project (1926)					
Alfalfa	2.32 tons	1,019	$14.50	$33.60	$33,147.82
Grain	10.25 bushels	231	1.05	10.76	2,493.63
Potatoes	1.55 tons	26	45.00	69.75	1,917.12
Garden		14		14.90	212.80
Pasture		200		2.00	400.00
Dairy products					1,420.00
Total					40,511.37
(b) Entire project (1927)					
Alfalfa	2.3 tons	798	13.00	29.90	24,067.81
Grain	8.63 bushels	264	1.25	10.79	2,886.35
Sugar beets	7.12 bushels	23	7.50	53.40	1,275.00
Garden		23		102.00	2,460.00
Potatoes	0.95 tons	41	37.40	35.50	1,477.50
Miscellaneous crops		97		6.00	584.25
Pasture	2.00	350		2.00	700.00
Total					34,450.91
(c) Lessees (1927)					
Alfalfa	1.00 tons	16	9.00	9.00	144.00
Potatoes	1.66 tons	1	30.00	49.80	75.00
Garden		0.25			25.00
Total					244.00
(d) White owners (1927)					
Alfalfa	2.75 tons	23	10.00	27.50	650.00
Wheat	6.70 bushels	11	1.50	11.05	115.00
Garden		1		300.00	300.00
Potatoes	3.13 tons	3	35.00	109.55	385.00
Miscellaneous crops		4		5.00	20.00
Total					1,470.00

15. Economic conditions among project farmers

	1924	1925	1926
(a) Non-Indian farmers			
Number of landowners	2	2	2
Acreage	25	25	25
Acreage cultivated (owners)	5	6	21
Acreage leased	None.	None.	None.
Acreage cultivated (lessees)			20
Average acre crop value	$60	$66	$40
(b) Indian farmers			
Families farming	82	90	92
Acreage cultivated	1,527	1,494	1,488
Acreage cultivated per family	18	16	16
Average acre crop value	$16	$32	$25
Average crop value per family	$300	$645	$422
Total livestock:			
Horses	292	400	282
Cows, dairy	94	85	94
Cows, beef		400	[3] 364
Hogs		47	36
Total equipment:			
Plows		60	62
Mowers	[2]	40	41
Tractors	[2]	1	1
Automobiles	[2]	55	47
Trucks	[2]	1	2
Acreage Indian land leased			20
Average rental per acre			$5
Average annual per capita payment from tribal resources	None.	None.	None.
Total Indian reimbursement debt [1]	$26,068	$25,682	$19,472
Total Indian tribal fund	None.	None.	None.

Annual acreage construction assessments (Indian land). No assessments levied.
Annual operation and maintenance assessments (Indian land). No assessments levied.

[1] Not including irrigation.
[2] No data.
[3] Cattle sold during the year; no data on number owned.

16. PROJECT OPERATION AND MAINTENANCE

(a) Organization

Project foreman: Has charge of Walker River and Pyramid Lake projects, also assists the superintendent with irrigation work on the Fallon Indian Reservation.

Ditch rider: Employed on an 8-months basis, but usually works the full year if needed. Patrols 30 miles of canals and ditches, distributes all water, and assists with maintenance work.

Approximate number of days irregular labor, men-days, 250; approximate number of days irregular labor, team-days, 90.

(b) Project operation and maintenance annual expense

Superintendence	$1,100
Ditch rider (canal riding)	880
Ditch cleaning	733
General expense, labor	281
Auto expense	304
Materials and supplies	467
Total	3,765

	1925	1926	1927
Annual operation and maintenance cost	$3,361.01	$5,117.96	$6,372.00
Operation and maintenance, acre cost (irrigable)	.93	1.42	1.77
Operation and maintenance, acre cost (cultivated)	2.19	3.38	3.85
Estimated cost per mile of canals and laterals, maintenance			60.00
Net cost per mile of canals and laterals, operation			46.00

17. CONSTRUCTION AND OPERATION-MAINTENANCE COSTS AND COLLECTIONS

(a) Construction cost and collections to June 30, 1927

Reimbursable appropriations		$126,294.51
Nonreimbursable appropriations		7,293.77
Liabilities		431.42
Total		136,019.70
Estimated cost to complete for 7,300 acres—Walker Lake Division [1]	$73,000.00	115,000.00
Estimated cost per acre ultimate area, 10,278 acres [2]		52.56
Present cost per acre for 7,300 acres		18.63
Present cost per acre for 3,600 acres [3]		37.77
Estimated cost completed (10,278 acres) [2]		540,000.00
Per acre value of land without irrigation		10.00
Per acre value of land with irrigation		150.00
Increased value by irrigation		140.00

(b) Collection of construction cost.—No construction collections are being made. Under the act of Congress of February 14, 1921 (41 Stat. 408), Indians are required to make repayment to the United States for cost of construction under such regulations as the Secretary of the Interior may prescribe. No regulations have been issued because the Indians are financially unable to pay any charges.

(c) Operation and maintenance cost to June 30, 1927

Reimbursable appropriations	$59,055.03
Nonreimbursable appropriations	1,395.04
Tribal funds	1,785.87
Transfer vouchers received	2,636.36
Liabilities	634.11
	65,506.41

[1] Depending on degree and kind of construction; also whether storage is provided, etc.
[2] Including $300,000 for proposed Rio Vista Reservoir.
[3] Present irrigable area.

Transfer vouchers issued (less)	$697.47
Subtotal	64,808.94
Chief Engineer's office charges	1,234.05
Total	66,042.99

No operation and maintenance collections being made.

18. PROJECT DEFECTS, PROBLEMS, AND COMPLAINTS

The most serious defect on this project is the lack of a good, steady water supply. The Government has instituted a suit in the Federal court to determine the water rights of this project, which, when completed will to some extent—at least during some years—correct this defect. The location of the diversion dam is very unsatisfactory and is a constant source of expense. The dam is too low to raise the water high enough to irrigate all the allotted land and is not even above the allotted area. Because of the location of the headgates and dam, it is impossible to run water without filling canals with sand. The balance of the irrigation system is well planned and built, although a first-class topograhic survey should be made of all the irrigable area. Sufficient funds have not been available the last four years to properly maintain the project, and in consequence, the canals are in extremely bad condition.

From an operating point of view the chief problem is trying to distribute a very irregular water supply to the satisfaction of everyone. The Indian farmers are very adverse to having their gates locked, to using water on a schedule in rotation, or to irrigating at night, with the result that considerable friction develops during periods of very low flow. Moreover, these practices or habits do not make for an economical use of water and the almost total waste of water during the night leads to considerable criticism from the upper water users and citizens of the State in general. The nonuse of water during the night also limits the flow of water diverted to the capacities of the wasteways and during period of peak demand the Indians are very critical because more water is not run in the upper reaches of the canal.

From an economic standpoint, probably the chief problem is the lack of good farmers. The Indians here have done very well for Indians, but nevertheless they need considerable education in farming. Their complete isolation from white farmers precludes their obtaining much practical education from that source. These Indians are very receptive to the opium and other narcotic vices and it is getting to be more common. Once they acquire the habit they are of no use as farmers, as their craving for dope compels them to secure employment where they are paid daily. The Indian farmers have very little capital which hinders their efforts greatly. The fact that about 50 per cent of the project land is held as heirship land, known as "deceased allotments," greatly retards the growth of the project.

It seems that a more definite and effective Federal law should be in force to handle the theft of water and destruction of property, especially among Indians. The Nevada law denies any jurisdiction over disputes among Indians.

Irrigation on Yakima Reservation, Washington

1. RECOMMENDATIONS

It is recommended:

1. That as the 80-acre allotments on this project are larger than most Indians, or even many non-Indians, can properly farm, the Indians be induced to confine their operations to 20 or 40 acres, and the remaining land be leased.

2. That a more satisfactory leasing system featuring longer time leases and more favorable terms to lessees, so as to get successful farmers, be adopted. The law now provides that leases may be executed for 10-year periods, and the Indians should be required, where possible, to make these long-term leases, with provisions for necessary improvements to the land.

3. That as most of the Indians are leasing all their lands and living in idleness from the proceeds, every able-bodied Indian having no other occupation or means of support be required to farm at least a part of his land in a satisfactory manner, or if he refuse, that it be leased, and that all or a part of the proceeds from the lease be applied on the repayment of the irrigation construction cost.

4. That construction charges upon both classes of land be collected upon Indian land except the 40 acres provided for as a homestead, and provided also the annual collection for this purpose does not exceed 50 per cent of the cash rental

to be paid by the lessee. The annual construction charge should not accrue against the 40-acre homestead, so long as the Indian continues to farm it. The Indian shall be required to pay the annual operation and maintenance assessment on all lands under constructed ditches, including the 40-acre homestead farmed by him.

5. That the present assessment of $2.50 per acre against all lands under the Wapate unit be continued, as it is a reasonable charge; that $1 be assessed against the lands under the Ahtanus unit, and $1 against the lands under the Satus unit receiving a water supply from the Wapate unit drainage system, as a construction assessment.

6. That the present method of collecting operation and maintenance charges in advance be continued on all units, and that the method of assessing a flat rate on the Wapato unit be changed to a minimum rate for a certain quantity of water, with another rate for additional water as used. Such a method of collecting the operation and maintenance cost should greatly encourage the conservation of water.

7. That the amount of reimbursable moneys expended for operation and maintenance in excess of collections and which amounts to $105,030.56 be included in the construction costs of the Wapato unit; that the amount of $3,710.81 on the Ahtanum project accrued under the same conditions should also be included in the construction costs.

8. That the 21,000 or more acres of land under the gravity system of the Wapato unit not now in cultivation can in part be reclaimed by improvements to the present drainage system and the extension of the farm laterals. Probably all of this land can be reclaimed to the extent that it will be good pasture land. Your advisers recommend that the bureau give its attention to bringing this land under cultivation, or at least as much of it as is possible, before undertaking new units. It is quite probable that more Indian land can be brought under irrigation by this method than by constructing new units, and the expenditures involved would be far less than for a similar area under a new unit. Longer terms for leases are necessary, and the redemption of the land should be the main consideration for the lease rather than the erection of buildings or a cash rental. No leases of Indian land should be executed which do not require the land to be irrigated if the land is under constructed ditches. The project should supply water to the farmers on these alkalied lands for the purpose of washing out the alkali without cost. We also recommend that the construction assessments be suspended on this class of land for a period of five years and that necessary legislation be obtained to accomplish this end.

9. The practice of water users of applying excessive quantities of water to the cultivated fields in the early season, and which raises the underground water level to an extent that it acts as a reservoir in the latter part of the season, may have value in storing water, but it would seem to be detrimental in leaching out soil fertility. Your advisers recommend that a board composed of a soil expert from the Bureau of Soils, an expert on western irrigated farm crops from the Department of Agriculture, and an irrigation engineer outside of the Indian Service be appointed to make a study and report on the desirability or undesirability of continuing this practice.

10. The appropriation act for the fiscal year 1921 (41 Stat. 431) permits the construction collections to be expended for construction purposes, without again being specifically appropriated by Congress. It creates a revolving fund to be handled in a manner entirely different from Government appropriated funds on other Indian and reclamation projects and contrary to the budget theory of control of funds. If the budget system is to operate successfully, all Government funds should pass through the Budget Bureau and be appropriated by Congress for specific purposes. Your advisers recommend that the system of handling all Government funds be made uniform and that the above law be repealed.

11. That before irrigation construction work be undertaken on any new units on this reservation, that the detailed plans and specifications be prepared and these, together with such economic data as may be obtainable, be passed upon by a competent, disinterested board of engineers and economists.

2. SYNOPSIS

The Yakima Reservation, 75 miles long by 40 miles wide, was established by treaty of June 9, 1855. One-half of the reservation is covered with timber, while the other half is arid land, The Indians. consisting of confederated bands of Yakimas and Wapatos lived by fishing and hunting. Little work along agricultural lines was done prior to the establishment of the reservation. The first irrigation work consisting of the construction of several small ditches was done in

about 1860 and in 1904 the Reclamation Service made the first comprehensive plan for development.

The reservation is located in Yakima County, south central Washington and is on the main line of the Northern Pacific Railroad. The markets are local, being the northwestern coast cities.

Reservation lands and allotments.—The area of the reservation at present is 1,002,737 acres. Allotments were begun May 11, 1897, and continued until July 16, 1914, on which date the allotment rolls were closed. A total of 417,919 acres were allotted. There are 3,500 allotments, or 317,207 acres held under trust patents and 593 allotments or 40,440 acres are fee patented; 1,013 allotments of deceased Indians have been sold for approximately $2,092,167.

Population and Indian health conditions.—The population of the reservation is 3,024 of which 181 Indians have tuberculosis and 242 have trachoma. There are 987 families living in permanent homes and 7 Indians receiving rations.

Climate.—Elevation 700 to 1,700 feet. Average maximum temperature 104°; average minimum 5°; precipitation 7 to 10 inches; average growing season 215 days.

Topography, soil, and drainage.—A topographic survey was made between 1906 and 1909; 70,000 acres are more or less level with a slope of 14 feet to the mile; 30,000 acres of the so-called bench land has a fall ranging from 20 to 80 feet to the mile, while 20,000 acres bordering on Toppenish Creek has a fall of only 5 feet to the mile. The average cost of clearing, leveling, plowing and ditching differs little on the entire project of 120,000 acres. The average is $25 per acre.

Eighty thousand acres of the project have the so-called volcanic ash soil underlaid with a deep porous stratum of gravel. The soil depth varies from 1 to 10 feet, with the average being about 3 feet. The alkali conditions have improved over the project as a whole during the last ten years, due largely to increased drainage canals. One hundred and twenty-one miles of drains have been constructed with excellent results as shown by the 300,000 acre feet annual discharge.

Water supply and water rights.—No general adjudication of the water rights of the various canals in the Yakima Valley has been undertaken by the courts. The State Legislature for the State of Washington in 1905 delegated the authority to the United States Reclamation Service to handle the distribution of the flow of the Yakima River. The amount of water decreed by the Reclamation Service was entirely inadequate to supply the lands under the various canals. Congress, realizing the inadequacy of this supply, appropriated $635,000 under the act of August 1, 1914, to pay the Reclamation Service for additional water to provide the lands of the Wapato project with at least 720 cubic feet per second. This water cost the project lands approximately $1.40 per acre per year.

The Satus unit derives its warer supply from the drains from the Wapato unit, Toppenish Creek and Satus Creek, which will provide an ample supply of water for this project under any conditions.

The Ahtanum unit derives its water supply from Ahtanum Creek, which has an average annual run-off of approximately 70,000 acre-feet.

General plan of irrigation development.—The irrigation development on the Yakima Reservation has consisted of the initiation of four projects. The largest of these, the Wapato unit, consists of approximately 120,000 acres, of which three-fourths is yet in Indian ownership. The main canal cost approximately $600,000 and has a capacity of approximately 1,800 second-feet. It is proposed to install pumping plants to pump water on the 20,000 acres which lie above the main canal. The entire cost of the project is to be repaid by the landowners, and all white owners were required to sign an agreement to this effect. These agreements are recorded in the county records and thus become liens against the land covered.

The only construction work done on the Toppenish-Simcoe unit is the construction of a canal to divert the flood waters from Toppenish Creek into the proposed reservoir on the Simcoe Creek. Irrigation laterals divert water from this canal and the entire flood waters of both creeks are used. The flood waters from these two creeks is used to irrigate approximately 8,000 acres. However, there is not sufficient water to irrigate this land after the middle of June. The cost of this project is estimated to be between $85 and $100 per acre when completed and will require an expenditure of approximately $1,650,000 to complete.

The Satus unit contemplates the irrigation of approximately 40,000 acres. Before the entire area can be placed under irrigation it will be necessary to construct a storage reservoir on Satus Creek to store approximately 53,000 acre-feet of water. At the present time, there are approximately 8,000 acres being irrigated from drainage water developed on the Wapato unit and supplied by gravity

canals. This supply, however, is inadequate for irrigation at the latter part of the season. The water diverted from the drainage canals on the Wapato unit is taken out by a short canal at the lower end of the main drain, which is 1½ miles with a capacity of approximately 300 second-feet. The check and headgate at the intake of this canal cost approximately $12,500 and the structures carrying the canal across Toppenish Creek approximately the same. The land in this unit is for the most part still in Indian ownership.

The Ahtanum unit covers an area of approximately 5,000 acres. The main canal which irrigated this land is approximately 17 miles long and the water is diverted from Ahtanum Creek by a temporary brush dam. The land under this canal is practically all in Indian ownership. The water supply after the 1st of July is very uncertain and no reservoirs have been constructed. A contract with the white water users on the north side of the creek provides that the Indian lands may have 25 per cent of the natural flow and an equal share of the return flow of the creek. This water supply often gets as low as 7 second-feet. It is estimated that storage for this project will cost approximately $300,000. The cost of the entire work done to date amounts to approximately $35 per acre. The main canal supplying this project has a capacity of approximately 70 cubic feet per second and owing to the fact that it is located on a steep side hill the operation and maintenance costs are higher than those on the other units of the Yakima Reservation.

Summary of project works.—On the Wapato unit there are 585 miles of canals and laterals; on the Satus unit 31 miles; on the Toppenish-Simcoe 19 miles and on the Ahtanum 12 miles making a total of 635 miles for the entire project. There are 121 miles of drainage canals raning in capacity from 50 to 600 second-feet.

The project telephone lines aggregate 57 miles with 17 stations. No summary of structures was given in the data submitted by the project management.

Area and utilization of arable and irrigable lands.—Of 185,000 acres that will ultimately be irrigable when the project is completed, 103,586 acres are now under constructed works; 87,781 acres are now irrigated and of the present irrigable acreage, 65,711 acres are in Indian ownership, while 37,875 acres are in white ownership. Of the acreage irrigated 9,099 acres are cultivated by Indians, 44,696 acres by lessees, and 33,822 by white owners.

Principal crops, crop yields, and returns.—The project management reports that during the season of 1924, 10,080 acres were farmed by Indians, the average per acre crop return being $44. For the season of 1925, 6,143 acres were farmed by Indians with an average per acre crop yield of $55. For the season of 1924 lessees farmed 32,790 acres having an average crop yield of $68 per acre. For the season of 1925, lessees farmed 38,099 acres with an average crop yield of $85 per acre. For the season of 1924, white owners farmed 28,202 acres with an average crop yield of $100 per acre. For the season of 1925, white owners farmed 29,048 acres with an average crop yield of $135 per acre. The high crop yield of white-owned land as compared with Indian farmed and leased land is due to the fact that many of the white owners have fruit orchards.

Economic conditions among project farmers.—The acreage farmed by Indians on the Wapato unit decreased in two years by 2,582 acres. The acreage leased increased.

Project operation and maintenance.—The organization at Wapato and the other three Yakima Reservation projects consists of 1 project engineer, salary $3,800 per annum; 1 engineer, $2,700; 1 senior clerk, $1,800; 3 supervisors of ditches, $2,700; 1 hydrographer, $2,100; 1 instrumentman, $1,500; 1 storekeeper, $2,100; 1 timekeeper, $1,620; 17 ditch riders, of which 5 receive $125 per month and 17, $135 per month; 1 machinist at $7 per day; 1 carpenter at $6 per day; one shop foreman, $2,100 per annum; 1 garageman, $1,860; janitor and night watchman, $125 per month, motor-truck driver, $125 per month and laborers as needed at $4 per day. Deductions for quarters are made for the majority of the positions given above.

The total annual expense for operation and maintenance is $88,280.59.

Construction and operation-maintenance costs and collections

Construction cost to June 30, 1927:	
Wapato	$3,291,318.00
Ahtanum	94,114.12
Toppenish-Simcoe	143,823.30
Satus	177,647.87

Construction collections to May 30, 1927:	
Wapato	$737,098.59
Ahtanum	833.66
Toppenish-Simcoe	None.
Satus	None.
Operation and maintenance costs to June 30, 1927:	
Wapato	1,136,240.04
Ahtanum	74,115.85
Toppenish-Simcoe	14,705.90
Satus	19,298.39
Operation and maintenance collections to June 30, 1927:	
Wapato	1,045,611.99
Ahtanum	69,002.11
Toppenish-Simcoe	1,686.75
Satus	5,867.16

I. DIGEST OF TREATIES, EXECUTIVE ORDERS, AND LEGISLATION

Treaties.—The first treaty with the Yakima and confederated tribes was signed June 9, 1855, by Isaac I. Stevens, governor of the Territory of Washington and the headmen of the Yakima Nation. This treaty outlined the boundaries of the reservation which contained approximately 1,000,000 acres. It guaranteed certain rights to the Indians, such as exclusive fishing privileges and certain employees to teach the Indians how to farm and provide them with common school facilities.

The second agreement made with the Yakima Indians was signed January 13, 1885, by Robert S. Gardener, United States Indian inspector, and the head chiefs and headmen of the tribe. This agreement ratified the act of Congress of July 2, 1864, in which the construction of a railroad and telegraph line was authorized through the reservation. The United States paid the Indians $5,309 for this right of way.

The third agreement was signed January 8, 1894, by John Lane, special United States Indian agent, and Lewis T. Erwin, United States Indian agent for the Government, and by the various chiefs for the Indians. This agreement provided for the relinquishment to the United States of a body of land of approximately one township, situated at the forks of the Piscyouse or Wenatshapam River, known as the Wenatshapam fisheries. The Indians were paid $20,000 from this county. This agreement was ratified by Congress under date of August 15, 1894 (28 Stat. 320).

Laws.—The first law affecting irrigation in any way was the act of October 1, 1890 (26 Stat. 661). This granted a right of way for a canal to the Northern Pacific & Yakima Irrigation Co. through the Yakima Reservation. By the act of July 23, 1894 (28 Stat. 118) a right of way for a canal was granted to the Columbia Irrigation Co. through the Yakima Reservation. Neither of these canals, however, were constructed. The act of December 21, 1904 (33 Stat. 595) establishing the western boundary of the Yakima Reservation, and providing for the sale of unallotted and surplus allotted land, contained the following provision:

"*Provided further*, That where valid rights have been acquired prior to March 6, 1904, to lands within said tract by bona fide settlers or purchasers under the public land laws, such rights shall not be abridged and any claims of said Indians to these lands are hereby declared to be fully compensated for by the expenditure of money heretofore made for their benefit and in the construction of irrigation works on the Yakima Indian Reservation."

The act of December 21, 1904 (33 Stats. 595), known as the Jones Act, provided for the irrigation of the irrigable lands on the Yakima Reservation. The provisions of this act, however, were never carried into effect, owing to objections by the Indians, and it was superseded by the act of May 18, 1916 (39 Stats. 153). The act of June 21, 1906, provided $15,000 for extension of irrigation systems on Indian lands on the Yakima Reservation, to be reimbursed according to the terms of the act of December 21, 1904. The acts of March 1, 1907 (34 Stats. 1050), April 30, 1908 (35 Stats. 96), and March 3, 1909 (35 Stats. 813), appropriated $15,000 each for the same purpose as the act of June 21, 1906. The act of April 4, 1910 (36 Stats. 286), provided $15,000 for extension of irrigation systems, and $250,000 for the initiation of the construction of a drainage system for the Wapato project. The acts of March 3, 1911 (36 Stats. 1075), August 24, 1912 (37 Stats. 583), and June 30, 1913 (38 Stats. 100), each provided $15,000 for the extension and maintenance of irrigation systems on the Yakima Reserva-

tion. The act of June 30, 1913 (38 Stats. 100), also provided for the appointment of a joint congressional committee to investigate and report on the feasibility of constructing irrigation systems on the Yakima Reservation.

The act of August 1, 1914 (38 Stats. 604), is as follows:

"It appearing by the report of the joint congressional commission, created under section twenty-three of the Indian appropriation act, approved June thirtieth, nineteen hundred and thirteen (Senate Document Numbered three hundred and thirty-seven, Sixty-third Congress, second session), that the Indians of the Yakima Reservation in the State of Washington, have been unjustly deprived of the portion of the natural flow of the Yakima River to which they are equitably entitled for the purpose of irrigation, having only been allowed one hundred and forty-seven cubic feet per second, the Secretary of the Interior is hereby authorized and directed to furnish at the northern boundary of said Yakima Indian Reservation, in perpetuity, enough water, in addition to the one hundred and forty-seven cubic feet per second heretofore allotted to said Indians, so that there shall be, during the low-water irrigation season, at least seven hundred and twenty cubic feet per second of water available when needed for irrigation, this quantity being considered as equivalent to and in satisfaction of the rights of the Indians in the low-water flow of Yakima River and adequate for the irrigation of forty acres on each Indian allotment; the apportionment of this water to be made under the direction of the Secretary of the Interior; and there is hereby authorized to be appropriated the sum of $635,000 to pay for said water to be covered into the reclamation fund; the amount to be appropriated annually in installments upon estimates certified to Congress by the Secretary of the Treasury. One hundred thousand dollars is hereby appropriated to pay the first installment of the amount herein authorized to be expended, and the Secretary of the Interior is hereby directed to prepare and submit to Congress the most feasible and economical plans for the distribution of said water upon the lands of said Yakima Reservation, in connection with the present system and with a view to reimbursing the Government for any sum it may have expended or may expend for a complete irrigation system for said reservation.

"For operation and maintenance of the irrigation system on lands allotted to Yakima Indians in Washington, $15,000, reimbursable in accordance with the provisions of the act of March first, nineteen hundred and seven."

Joint resolution of March 4, 1915 (38 Stats., 1226) reenacted the last foregoing provisions for the fiscal year 1916, $15,000 for operation and maintenance.

Act of May 18, 1916 (39 Stats., 153):

"For operation and maintenance of the irrigation system on lands allotted to Yakima Indians in Washington, $15,000, reimbursable in accordance with the provisions of the act of March first, nineteen hundred and seven: *Provided*, That money received under agreements for temporary water supply may be expended under the direction of the Secretary of the Interior for maintenance and improvement of the irrigation system of said lands.

"For construction of a dam across the Yakima River for the diversion and utilization of water provided for forty acres of each Indian allotment on the Yakima Reservation, Washington, and such other water supply as may be available or obtainable for the irrigation of a total of one hundred and twenty thousand acres of allotted Indian land on said reservation, and for beginning the enlargement and extension of the distribution and drainage system on said reservation, $200,000, to be immediately available and to remain available until expended: *Provided*, That the cost of the entire diversion works and distribution and drainage system shall be reimbursed to the United States by owners of the lands irrigable thereunder in not to exceed twenty annual payments, and the Secretary of the Interior may fix operation and maintenance charges, which shall be paid as he may direct.

"In the apportionment of charges against Indians, due allowance shall be made for such amounts as may have been repaid the United States on account of reimbursable appropriations heretofore made for this project and for the construction of the irrigation system prior to the passage of the act of December twenty-first, nineteen hundred and four (Thirty-third Statutes at Large, page five hundred and ninety-five), as therein provided. All charges against Indian allottees herein authorized, unless otherwise paid, may be paid from individual shares in the tribal fund when the same is available for distribution, and if any allottee shall receive patent in fee to his allotment before the amount so charged against him has been paid to the United States, then such amount remaining unpaid shall be and become a lien upon his allotment, and the fact of such lien shall be recited in such patent and may be enforced by the Secretary of the Interior by foreclosure as a mortgage; and should any Indian sell any part of his

allotment with the approval of the Secretary of the Interior, the amount of any unpaid charges against the land sold shall be and become a first lien thereon and may be enforced by Secretary of the Interior by foreclosure as a mortgage, and delivery of water to such land may be refused within the discretion of the Secretary of the Interior until all dues are paid: *Provided further*, That no right to water or to the use of any irrigation ditch or other structure on said reservation shall vest or be allowed until the owner of the land to be irrigated as herein provided shall comply with such rules and regulations as the Secretary of the Interior may prescribe, and he is hereby authorized to prescribe such rules and regulations as he may determine proper for making effective the foregoing provisions, and to require of owners of lands in fee such security for the reimbursement herein required as he may determine necessary, and to refuse delivery of water to any tract of land until the owners thereof shall have complied therewith.

"For the third installment in payment of $635,000 for water supply for irrigation of forty acres of each Indian allotment on the Yakima Indian Reservation irrigation system, in the State of Washington, provided by the act of August first, nineteen hundred and fourteen (Thirty-eighth Statutes at Large, page six hundred and four), $100,000 to be covered into the reclamation fund."

Act of March 2, 1917 (39 Stats., 989): For operation and maintenance, $15,000. Continuing construction, $200,000.

Act of May 25, 1918 (40 Stats., 587): For operation and maintenance on the Yakima Reservation, $15,000. For fifth installment to Reclamation Bureau on account of storage water purchased, $100,000. For continuing construction of Wapato project, $500,000. For improvement, maintenance, and operation Ahtanum project, $23,000. For operation and maintenance Toppenish-Simcoe and Satus units, $3,000.

Act of June 30, 1919 (41 Stats. 27): For operation and maintenance, irrigation systems, Yakima Reservation, $15,000; for sixth installment on account of storage water purchased of Reclamation Bureau, $100,000; and for beginning the construction of diversion dams and canal systems for irrigating 12,000 acres of Indian land adjacent to Toppenish and Simcoe Creeks, Yakima Indian Reservation, $75,000, the total cost not to exceed $150,000: "*Provided*, That the cost of the diversion dams and distributing systems shall be reimbursed to the United States by the owners of the lands irrigable thereunder in not to exceed 20 annual payments, and the Secretary of the Interior may fix operation and maintenance charges, which shall be paid as he may direct: *Provided*, That if any allottee shall receive patent in fee to his allotment before the amounts so charged against him shall have been paid to the United States, then such amount remaining unpaid shall be and become a lien upon his allotment, and the fact of such lien shall be recited in such patent and may be enforced by the Secretary of the Interior by foreclosure as a mortgage, and should any Indian sell any part of his allotment with the approval of the Secretary of the Interior, the amount of any unpaid charges against the land sold shall be and become a first lien thereon and may be enforced by the Secretary of the Interior by foreclosure as a mortgage, and delivery of water to such land may be refused within the discretion of the Secretary of the Interior until all dues are paid: *Provided further*, That no right to water or to the use of any irrigation ditch or other structure on said reservation shall rest or be allowed until the owners of the land to be irrigated as herein provided shall comply with such rules and regulations as the Secretary of the Interior may prescribe, and he is hereby authorized to prescribe such rules and regulations as he may determine proper for making effective the foregoing provisions, and to require of owners of lands in fee such security for the reimbursement herein required as he may determine necessary, and to refuse delivery of water to any tract of land until the owners thereof shall have complied therewith."

Act of February 14, 1920: Wapato, $250,000, for continuing construction, etc., and "*Provided further*, That the Secretary of the Interior is hereby authorized and directed to collect on or before December 31 of each calendar year hereafter, including 1920, from the white landowners under said system the sum of $5 per year for each acre of land to which water for irrigation purposes can be delivered from the system, which sum shall be credited on a per acre basis in favor of the land in behalf of which it shall have been paid and be deducted from the total per acre charge assessable against said land when the amount of such charge can be determined and the total amount so collected, including any money collected from Indian allottees shall be available for expenditure under the direction of the Secretary of the Interior for continuing the construction work of said system." For completing Toppenish-Simcoe, etc., $75,000.

Act of March 3, 1921: For continuing construction Wapato irrigation and drainage, $250,000, of which $50,000 was immediately available. For operation

and maintenance on Toppenish-Simcoe, $5,000. For operation and maintenance, including repairs, Ahtanum, $3,000.

Act of May 24, 1922: For continuing enlargement, etc., Wapato project, $250,000. For operation and maintenance Toppenish-Simcoe, $4,500. For operation and maintenance, including repairs, Ahtanum, $2,800.

Act of January 24, 1923: For continuing construction and enlargement, Wapato, $190,000. For operation and maintenance and repairs, Toppenish-Simcoe, $5,000. For operation and maintenance and repairs, Ahtanum, $2,800. For construction of Satus unit (gravity from drain), $125,000. Also $11,000 to pay United States Reclamation Service for storage, operation, and maintenance, not reimbursable.

Act of June 5, 1924: For operation and maintenance, including repairs, Toppenish-Simcoe, $5,000. For operation and maintenance, including repairs, Ahtanum, $2,800. For continuing construction, Wapato project, $10,000. For construction, Satus, $50,000. Also $11,000 for storage, operation, and maintenance for United States Reclamation Service, nonreimbursable.

Act of March 3, 1925: For operation and maintenance, including repairs, Toppenish-Simcoe, $3,500. For continuing construction, Wapato, $10,000. Operation and maintenance, Satus unit, $5,000. Also $11,000 for operation and maintenance storage for United States Reclamation Service, nonreimbursable.

Act of May 10, 1926: For operation and maintenance, Toppenish-Simcoe, $2,500. For operation and maintenance, Wapato, $6,000. For operation and maintenance, Satus, $4,000. Also $11,000 for operation and maintenance storage for United States Reclamation Service, nonreimbursable.

Act. of January 12, 1927: For operation and maintenance, Toppenish-Simcoe, $2,000. For construction and operation and maintenance, Wapato, $185,000. For operation and maintenance, Satus, $3,000. Also $11,000 for United States Reclamation Service, for operation and maintenance storage, nonreimbursable

4. HISTORY

Reservation established.—The Yakima Indian Reservation was established by treaty dated June 9, 1855, and ratified March 8, 1859, by Congress. The reservation is located in the south central portion of the State of Washington, and covers approximately a million acres. It lies between the foot of Mount Adams and the Yakima River; being approximately 75 miles in length and 40 miles from its northern boundary on the Ahtanum Creek and its southern boundary. Nearly one-half of the reservation is covered with timber and the other half practically arid, having but little vegetation except sagebrush.

Early irrigation.—The Indians are the confederated bands of the Yakimas, Wapatos, and several remnants of small tribes. These Indians were accustomed to making their living by hunting and fishing, particularly fishing, and lived seminomadic lives. They had done but very little work along agricultural lines prior to the establishment of the reservation. The treaty provided for Government employees to teach them how to farm, and shortly after the establishment of the reservation two or three small irrigation canals were constructed for their benefit, probably about the year 1860. The first canals were built on Toppenish Creek near Fort Simcoe where the first agency was established. The next development was on the Ahtanum Creek, under the auspices of Catholic mission at that place.

Beginning of Wapato unit.—The first schedule of allotments was approved May 11, 1897. Shortly thereafter the Indians were allowed to make leases through the agent of the reservation, and a considerable number of leases were made to white lessees who constructed irrigation ditches from the Yakima River and Toppenish Creek to irrigate the most accessible of these lands on the southern portion of the Wapato project. The Government aided in the construction of some of these ditchs by using part of the proceeds of Wenatshapam fisheries and other moneys made available for the general welfare of the Yakima Indians. The first appropriation for construction of the Wapato project was made in 1904. The largest canal in which the Government aided in construction was known as the old Erwin ditch. This ditch was built without adequate engineering plans, and was later abandoned owing to its steep gradient. The first appropriation made directly for work on the Wapato project was $15,000 in the year 1904. These moneys were expended in the construction of a headgate and a portion of the main canal located on the side of the present main canal. Comprehensive plans for the irrigation of the maximum amount of land based on the Wapato project were made pursuant to the act of 1904 by the Reclamation Service. The provision in this act that the Indians might sell a

portion of their land to pay for the construction of the irrigation system providing water for the balance of their allotments was objectionable and the plans were not further prosecuted.

Purchase of water from Reclamation Service.—Owing to the fact that the Indians had irrigated but a small portion of the lands susceptible of irrigation when the waters of the Yakima River were tentatively apportioned among the various users by a determination of water rights pursuant to State law, as formulated by the Interior Department in 1905, only 147 were alloted to this project. This amount of water was entirely inadequate, and Congress by the act of August 1, 1914 (38 Stat. 604), recognized the fact that a water right should be provided for at least 40 acres of each allotment and accordingly appropriated money to buy enough water from the United States Reclamation Service to supply at least 720 cubic feet per second. The act of May 18, 1916, adopted the plans that had been proposed to Congress pursuant to instructions that an engineering survey should be made to determine the most feasible plan for the utilization of this water, and appropriated $200,000 for beginning construction of a permanent diversion dam across the Yakima River. Congress had meanwhile been making appropriations from 1904 for operation and maintenance to the various irrigation canals on the Yakima Reservation. The act of February 14, 1920, required that the owners of patent in fee land commence repayment of the cost of construction. Per acre assessments for operation and maintenance have been made on this project for all leases since about 1908.

Ahtanum unit.—The land under the Ahtanum project was allotted at about the same time as the Wapato project. There were several small ditches on this project which the Indians had been using to irrigate their small gardens since the mission started its work in about 1860. In 1905 an agreement was entered into by Mr. W. H. Code, then chief engineer of the Irrigation Service and the white users on the north side of the creek by which the Indians were given 25 per cent of the water, and the remainder to the users on the north side. In 1908 the Government constructed a headgate to take water from the Ahtanum Creek and built the main canal with an estimated capacity of 70 cubic feet per second. At that date not more than 2,000 acres were being irrigated. In 1910 and 1911 the acreage under the canal was increased to practically the limit that could be irrigated. The ditch has been rebuilt and the wooden structures replaced with concrete in order that the best use possible may be made of the very limited amount of water flowing during the latter half of the irrigation season. The water rights of the land owners on the north side of Ahtanum Creek have been adjudicated in the State courts but the Indian land was not brought into the suit at that time. It is understood that a suit is contemplated in the Federal court that will finally determine the rights of this land to the use of the water of the Ahtanum Creek.

Satus unit.—Irrigation on the Satus unit was not practiced until a much later date than on the other units. The first irrigation ditch on this unit was constructed by lessees about 1908. This ditch diverted water directly from Satus Creek and irrigated about 2,000 acres. The first appropriation for work on this unit was made in 1923. The $125,000 appropriated in 1923, and the $50,000 in 1924, were expended for the construction of a ditch to divert water from the main ditch of the Wapato unit and Toppenish Creek. This ditch covers approximately 8,000 acres of land. Some work was also done on the gravity system from Satus Creek. It is planned that most of the water supply for this unit will be obtained from water stored in the Satus Creek. No appropriation has been made to date for this work and the only irrigation is from natural flow. It is estimated that approximately 40,000 acres of land equal in quality to that on the Wapato unit is susceptible of irrigation on this creek. The estimated cost to provide an adequate water supply and the construction of the canals required, is approximately $70 per acre.

Toppenish Simcoe unit.—The first irrigation on the reservation was from small ditches on what is now called the Toppenish Simcoe unit. These ditches irrigated the school and agency farms and the small truck patches and gardens of the Indians, and supplied them with domestic water. A number of these early canals have fallen into disuse. No comprehensive system providing for the utilization of the entire water supply has ever been definitely undertaken. In 1919 Congres appropriated $75,000, and again in 1920 a like amount for beginning construction of the Toppenish Simcoe unit. This amount of money, however, only provided for the construction of a flood-water canal from Toppenish Creek to the reservoir site on Simcoe Creek. Laterals have been constructed from this canal and the entire available water supply is used to its best advantage at the present time. Irrigation on this unit, however, is very unsatisfactory owing to the extreme shortage of water in the latter half of the season.

5. LOCATION, TRANSPORTATION, AND MARKETS

State: Washington.
County: Yakima.
Townships: 6 to 12 north, ranges 10 to 22 east, Washington base and meridian.
Railroads: Northern Pacific and Oregon-Washington Railroad and Navigation Railways; 58 miles railroad in reservation.
Cities: Toppenish, 3,700; Harrah, 200; Satus, 30; Wapato, 1,500; Parker, 300; White Swan, 300.
Railway stations: Parker, Wapato, Toppenish, Satus, Harrah, White Swan, Mabton.
Markets: Northern coast cities, intermountain section, south to Texas and northern States, east to the Great Lakes.
Indian agency: Toppenish, Wash.
Project office: Wapato, Wash.

6. RESERVATION LANDS AND ALLOTMENTS (AREA, CLASSIFICATION, AND VALUE)

(a) Areas

Area of reservation as originally established	837,754
Area of reservation at present	1,002,737
Area of grazing land	234,357
Area of timber land	[1] 768,380

(b) Allotments.—The first allotments were made May 11, 1897. The allotment roll was closed July 16, 1914. All Indians living at the time were allotted. Some of the young Indians on the last schedule received but 40 acres. The first and last schedules were approved May 11, 1897, and July 16, 1914, respectively.

(c) Classification of allotted lands

	Acres
Irrigated agricultural	80,767
Irrigable agricultural	29,000
Dry farming	26,000
Grazing and timber	282,152
Total	417,919

There are 3,500 allotments under this project, containing in all, 317,206.6 acres, now held under trust patent. Patents in fee have been issued to 593 allottees owning land totaling 40,440 acres. To date there have been sold 1,013 farming and grazing allotments of deceased Indians for an approximate total of $2,092,166.78. There are 724 unallotted Indians and 400 have received patents and sold their allotments.

7. POPULATION AND INDIAN HEALTH CONDITIONS

Yakima Indian tribe

	1925	1927
Indian births	57	53
Indian deaths	44	72
Total population	3,001	3,024

Number of Indians having tuberculosis, 6 per cent.
Number of Indians having trachoma, 8 per cent.
Number of Indians living in permanent homes, 987 families.
Number of full-blood Indians, 2,046; less than full blood, 978.
Number of Indians receiving rations, 7.

[1] 181,919 acres of this timber land is allotted. The total estimated value of timber and including the land is $7,279,295.

8. CLIMATE

Range in elevation of irrigable area, 700 to 1,700.
Average maximum temperature, 104°.
Average minimum temperature, 3°.
Average annual recipitation, 7 to 10; average rain, 6 to 9; average annual snow, 12 inches.
Average date last killing frost, spring, May 1.
Average date first killing frost, full, October 1.
Average growing season, 215 days.

9. TOPOGRAPHY, SOIL, AND DRAINAGE

A topographic survey was made between 1906 and 1909, with 5-foot contour intervals, and actual elevations of intermediate points shown on the plane-table sheets, the scale being 1,000 feet to the inch. These maps were made by the United States Reclamation Service. These maps are now on file in the project office at Wapato, Wash.

Seventy thousand acres are more or less level with a slope of 14 feet to the mile. Thirty thousand acres of the so-called bench land has a fall ranging from 20 to 80 feet to the mile, while 20,000 acres bordering on Toppenish Creek has a fall of only 5 feet to the mile.

The average cost of clearing, leveling, plowing, and ditching differs little on the entire project of 120,000 acres. The average is $25 per acre, although some have spent $50 per acre and some only $10 per acre.

(*a*) *Soil.*—No soil survey or chemical analysis of the soil of the Wapato project has been made. However, a survey of some of the areas somewhat affected with alkali is now being made by the Agriculture Department.

Eighty thousand acres of the project have the so-called volcanic ash soil underlaid with a deep porous stratum of gravel. The soil depth varies from 1 to 10 feet, with the average being about 3 feet. There are some gravel outcrops and some gravel has been uncovered in leveling the land.

Forty thousand acres are volcanic ash soil with a thin layer of hardpan in some places with 1 to 2 feet of soil on this so-called hardpan. Roots penetrate this thin layer of hardpan.

A uniform growth of sagebrush is the only vegetation on 100,000 acres of the project. On the other 20,000 acres there is some greasewood with sagebrush and some ryegrass.

The crops on various soils have not been carried separately in the various reports, and little difference is noticed in the yields.

Some 30,000 acres of the land north of Toppenish Creek was swamped and alkalied to some extent prior to 1910; much of it however, had never been irrigated but its condition was due to irrigation above. This land has now been drained and where farmed, is coming back after two to five years' labor, and is very productive. In round numbers 15,000 acres of this land requires additional drainage to speed up its reclamation.

There are scattered spots bordering on sloughs and on the bench lands where spots of alkali are noticeable, but no great area. The alkali conditions have improved over the project as a whole during the last 10 years, due largely to increased drainage canals. One hundred and twenty-one miles of drains have been constructed with excellent results, as shown by the 300,000 acre-feet annual discharge.

The continuous-flow method of water delivery is practiced almost entirely, with a few exceptions of water on demand.

The furrow or corrugation method is used entirely on each of the units of the Yakima project with the exception of the Ahtanum when deliveries are made in rotation during low water.

On the bench lands of the Wapato unit a head of 1 second-foot for 80 acres has been in use for some time, while a maximum of 1 second-foot for 40 acres is used on the more gravelly soils, or thin soils underlaid with gravel.

A diversion duty 4.5 acre-feet is used on the bench lands of the Wapato unit and a diversion duty of 7 acre-feet on the more flat lands underlaid with gravel, with an average of 6.4 acre-feet for the entire project for the five years beginning in 1922.

(*b*) *Drainage.*—The drainage conditions on the Yakima Reservation vary quite widely depending on the topography of the land.

The Wapato project has two types of soil. In the central and southern portions of the project the soil consists of a top layer of fine volcanic ash ranging in depth from a few inches to 10 feet underlaid with a stratum of very porous

river-washed gravel. In order to adequately drain the project, it is necessary to dig the drains deep enough to penetrate this stratum of gravel and obtain a gradient sufficient to discharge the drainage water into the Yakima River or to divert it for irrigation purposes on the lower or southeastern portion of the project. These drains, generally speaking, must be within a mile and a half of each other in order to keep the water table a proper depth. Drains were installed in connection with the construction of this project paralleling the east and west laterals and in the most cases, the water table is kept at the proper depth below the surface. In the extreme southern portion of the project the land is very flat and the outlet or main drain channel is of insufficient capacity to carry the water accumulated and, as a result, part of the land is inadequately drained. The lands lying above the main canal to which water will be pumped and those lands on the western part of the project are situated in a comparatively rolling country. The drains here to not penetrate into the gravel and merely act as surface drains. Unless these are kept in excellent condition, considerable subbing takes place. This condition has already affected several hundreds of acres and is likely to continue unless the present system of drains is supplemented with additional ones.

The land on the Toppenish-Simcoe project is generally steeper and the top soil is not as fine as the majority of the soil on the Wapato project and for this reason the drains will probably not be much of a problem.

The drainage system on the Satus project must be constructed in a manner similar to the lower part of the Wapato project as this soil is fine volcanic ash of considerable depth in some places underlaid with porous gravel. On the lower part of the Satus project the river has in ages past cut numerous channels which have become silted and now form barriers or dikes stopping the underground drainage. This condition necessitates the digging of the main drains to a greater depth than was at first considered necessary.

The Ahtanum project is situated on a steep side hill and the slope is such that the surface drainage takes care of all of the surplus water. No drainage canals have been dug by the service on this project.

10. WATER SUPPLY AND WATER RIGHTS

No general adjudication of the water rights of the various canals in the Yakima Valley has been undertaken by the courts. The State legislature for the State of Washington in 1905 delegated the authority to the United States Reclamation Service to handle the distribution of the flow of the Yakima River. Prior to this the old canal on the Wapato project was diverting approximately 400 second-feet and the Toppenish Canal approximately 104 and a filing had been made on 1,000 second-feet for the new canal when constructed, making a total contemplated diversion of 1,514 second-feet in 1904. In 1905 the United States Reclamation Service made a survey of the various diversions from the Yakima River at low water and made division of the water on that basis. The Wapato project was allowed 147 cubic feet per second of low-water flow. The 147 second-feet decreed by the Reclamation Service was entirely inadequate to supply the lands under the various canals. The Congress of the United States realizing the inadequacy of this supply, appropriated $635,000 under the act of August 1, 1914, to pay the Reclamation Service for additional amount of stored water to provide the lands of the Wapato project with at least 720 cubic feet per second. This supply was based on the presumption that the Indians should be allowed a free water right for at least 40 acres of each allotment. This supply, however, proved inadequate for the additional land that was put under irrigation and in 1919, 1920, and 1921 it was found necessary to purchase additional stored water from the Reclamation Service. This water cost the project lands approximately $1.40 per acre per year.

In 1921 an agreement was entered into between the Reclamation and Indian Bureaus providing for the purchase of 250,000 acre-feet of stored water for the Wapato project. The cost of this was to be finally determined in 1935. The payments were to be made 2 per cent in 4 years, 4 per cent in 2 years, and 6 per cent for 14 years based on an estimated cost of $8.50 per acre or a total of $1,625,000. Considering the irrigation season to be 200 days, the 720 second-feet will be approximately 288,000 acre-feet, and when this is added to the 250,000 acre-feet to be delivered from stored water the water supply for the Wapato project is approximately 538,000 acre-feet per annum. Due to the fact that approximately 25,000 acres within the project can be irrigated from drainage water diverted from the drains, this makes the total available water supply at approximately 725,000 acre-feet or 6 feet per acre.

The Satus unit of the reservation will derive its water supply from three sources—the drains from the Wapato unit, Toppenish Creek, which also collects considerable drainage from the Wapato unit, and Satus Creek, which runs through the center of the project. Satus Creek will, when provided with a storage reservoir, supply water for approximately half this area, and the other half will be obtained from drainage from the Wapato unit. These sources will provide an ample supply of water for this project under any conditions.

Satus Creek has a drainage area of approximately 427 square miles with a discharge ranging from a minimum of 10 to a maximum of 38.70 cubic feet per second. The mean annual run-off is 80,000 acre-feet. The reservoir that is proposed will have a capacity of approximately 50,000 acre-feet. The water supply for the Toppenish Simcoe unit will be obtained by storing the natural flow of Toppenish and Simcoe Creeks in a reservoir located on Simcoe Creek. The watershed of the two streams is approximately 212 square miles with a maximum combined run-off of 2,372 and a minimum of 10 cubic feet per second. The combined mean annual run-off is 70,000 acre-feet. The proposed reservoir will have a storage capacity of approximately 57,000 acre-feet. The water supply is adequate for between 18,000 and 20,000 acres. Both streams are entirely within the Yakima Reservation.

The Ahtanum project derives its water supply from Ahtanum Creek, which is the boundary stream on the north side of the reservation. The annual run-off of Ahtanum Creek averages approximately 70,000 acre-feet. The Indians built small ditches on this project at a very early date, approximately 1850 and very soon after, the homesteaders on the public domain on the north side of the creek also started to irrigate. Considerable difficulty in the division of the stream was occasioned by conflicting claims and on May 9, 1908, an agreement was entered into between W. N. Code, then chief engineer of the Indian Service, for the Secretary of the Interior and the landowners on the north side of the creek which provided that the Indians were to get 25 per cent of the natural and return flow of the creek and the white landowners the balance. This agreement provided that the landowners on either side of the creek should build ditches and carrying devices for diverting the water and the division would be made by disinterested parties. The Indian Service complied with this requirement and constructed one main canal and two smaller ditches, the small ditches being located lower down on the creek and utilized the Indians' allowance of return flow.

There are some 215 owners diverting water on the north side of the creek and approximately 119 diversions. The 25 per cent of the natural flow of this stream is entirely inadequate for the irrigation of approximately 5,000 acres of land under ditches as it amounts to from 5 to 7 second-feet after June 20 of each year. It is anticipated that the water right on this creek will be adjudicated by the courts.

11. GENERAL PLAN OF IRRIGATION DEVELOPMENT

The irrigation development on the Yakima Reservation has consisted of the initiation of four projects. The largest of these, the Wapato unit, consists of approximately 120,000 acres, of which three-fourths is yet in Indian ownership. The total estimated cost of this unit is $50 per acre. The water right is granted of the natural flow of the Yakima River adequate to supply this project when there is a sufficient amount in the river and a primary water right of 720 second-feet is guaranteed through storage purchased by Congress. Additional storage water has been purchased from the Reclamation Service which will guarantee an ample water supply for the entire area. A concrete diversion dam is located across the Yakima River and the main canal which is approximately 12 miles long runs at nearly right angles to the river. This gravity canal will supply approximately 100,000 acres of the area and it is proposed to install pumping plants to pump water on the 20,000 acres which lie above the main canal. The cost of this diversion dam was approximately $146,000 and the storage water purchased from the Reclamation Service which must be reimbursed by the land will cost approximately $1,625,000. The main canal cost approximately $600,000 and has a capacity of approximately 1,800 second-feet. The entire cost of the project is to be repaid by the landowners, and all white owners were required to sign an agreement to this effect. These agreements are recorded in the county records and thus become liens against the land covered

The Toppenish Sincoe unit lies on the western side of the Wapato unit and contiguous to it. It is proposed to store water from these two streams in storage reservoirs which have not been authorized. The only construction work done on this project is the construction of a canal to divert the flood waters from

Toppenish Creek into the proposed reservoir on the Sincoe Creek. Irrigation laterals divert water from this canal and the entire flood waters of both creeks are used. The diversion dam at the head of this canal on Toppenish Creek cost approximately $9,000. This diversion canal is approximately 10 miles long. The flood water from these two creeks is used to irrigate approximately 8,000 acres. However, there is not sufficient water to irrigate this land after the middle of June. The cost of this project is estimated to be between $85 and $100 per acre when completed and will require an expenditure of approximately $1,650,000 to complete.

The Satus unit lies directly south of the Wapato unit and contemplates the irrigation of approximately 40,000 acres. The greater portion of this land is yet in Indian ownership. Before the entire area can be placed under irrigation, it will be necessary to construct a storage reservoir on Satus Creek to store approximately 53,000 acre-feet of water. At the present time, there are approximately 8,000 acres being irrigated from drainage water developed on the Wapato unit and supplied by gravity canals. This body of land lies along the Yakima River at the lower end of the Satus Creek. Immediately above this body of land there lies approximately 11,000 acres which at present receive a partial supply of water from Satus Creek. This supply, however, is inadequate for irrigation at the latter part of the season. The water diverted from the drainage canals on the Wapato unit is taken out by a short canal at the lower end of the main drain, which is 1½ miles with a capacity of approximately 300 second-feet. The check and headgate at the intake of this canal cost approximately $12,500 and the structures carrying the canal across Toppenish Creek approximately the same.

The Ahtanum unit covers an area of approximately 5,000 acres along the Ahtanum Creek, which forms the northern boundary of the Yakima Reservation. The main canal which irrigates this land is approximately 17 miles long, and the water is diverted from Ahtanum Creek by a temporary brush dam. The land under this canal is practically all in Indian ownership. The water supply after the 1st of July is very uncertain and no reservoirs have been constructed. A contract with the white water users on the north side of the creek provides that the Indian lands may have 25 per cent of the natural flow and an equal share of the return flow of the creek. This water supply often gets as low as 7 second-feet. It is estimated that storage for this project will cost approximately $300,000. The cost of the entire work done to date amounts to approximately $35 per acre. The main canal supplying this project has a capacity of approximately 70 cubic feet per second, and owing to the fact that it is located on a steep side hill the maintenance and operation costs are higher than those of the other units of the Yakima Reservation.

Construction costs by divisions and by principal features, with estimated cost for completion

Wapato:	
Total ultimate area	120,000
Total construction cost to date	$3,291,318
Estimated cost to complete	$1,500,000
Percentage completed to date	76
Estimated acre cost when completed	$50
Area under constructed canals	85,000
Cost per acre under constructed canals	$38.75
Area actually irrigated	77,938
Construction cost of irrigated land (acre)	$42.23
Satus:	
Total ultimate area	40,000
Total cost to date	$169,611.11
Estimated cost to complete	$2,634,000.00
Percentage completed to date	24
Estimated cost per acre when completed	$60–$70
Area under constructed canals	9,586
Cost per acre under constructed canals	$17.75
Area actually irrigated	4,999
Construction cost of irrigated land (acre)	$36
Toppenish-Simcoe:	
Total ultimate area	20,000
Total cost to date	$143,823.30
Estimated cost to complete	$1,650,000.00
Estimated cost per acre when completed	$85–$100

Toppenish-Simcoe—Continued.	
Area under constructed canals	6,000
Cost per acre under constructed canals	$23.75
Area actually irrigated	1,621
Construction cost of irrigated land (acre)	$90
Ahtanum:	
Total ultimate area	5,000
Total construction cost to date	$94,241.54
Estimated cost to complete	$300,000.00
Estimated cost per acre when completed	$80
Area under constructed canals	5,000
Cost per acre under constructed canals	$13.70
Area actually irrigated	4,556
Construction cost of irrigated land (acre)	$13

12. SUMMARY OF PROJECT WORKS

(*a*) *Storage.*—There are no storage dams on the Yakima Reservation, the storage water being purchased from the Bureau of Reclamation under contract.

(*b*) *Diversions* (*Wapato*).—The Wapato Canal diverts water from the Yakima River in sec. 17, Twp. 12 N., R. 19 E. This structure includes two concrete O G weirs across the channels 200 and 420 feet long, respectively, founded on bed rock with the exception of the west 60 feet. The average height of dam being 22 feet with a maximum of 30 feet and a minimum of 14 feet. The longer section is provided with a fish ladder.

The two sections of the dam are connected with a 400-foot dike, and a 940-foot dike connects the east section or main river channel with the hills to the east. All dikes have heavy riprap placed on a layer of gravel.

The head gates is a combination of masonry, use being made of the old structure walls, and concrete, with a reinforced concrete house to protect the machinery. There are 6 cast-iron gates 6 feet by 6 inches square for divering water into the canal, and 2 sluice gates of the same dimensions placed 4 feet lower than the head gates. The gates are both raised and lowered by machinery operated with a turbine installed in the structure.

The dam was begun in July, 1916, and completed in April, 1917. The present condition is very good. The average cost of concrete was $9.70 per cubic yard including both mass and reinforced, the latter alone costing $14.

There were 7,271 cubic yards of concrete, at $9.70.

Class 1 excavation, 116,698 cubic yards, at $0.204.

Class 2 excavation, 13,001 cubic yards, at $0.446.

Class 3 excavation, 6,011 cubic yards, at $1.67.

Riprapping, including quarrying, 10,423 square yards, at $2.23.

200-foot suspension bridge, at $12.50 per foot.

Head gates, turbine, and hoisting mechanism, $4,559.61, or a cost of $144,264.30, not including depreciation and expense of chief engineer's office, but including $11,950.33 general expense.

The head gates have a capacity of 1,900 second-feet and the dam an overflow of 60,000 second-feet.

(*c*) *Canals*

	Miles
Wapato:	
Capacity—	
1,000 second-feet or more	9
500 to 1,000 second-feet	28
250 to 500 second-feet	32
50 to 250 second-feet	61
15 to 50 second-feet	138
Less than 15 second-feet	317
Total	585
Satus:	
Capacity—	
250 to 500 second-feet	1.5
50 to 250 second-feet	12.5
15 to 50 second-feet	10.7
Less than 15 second-feet	6.5

	Miles
Toppenish-Simcoe:	
Capacity—	
100 to 250 second-feet	2. 35
15 to 50 second-feet	8. 7
Less than 15 second-feet	8. 0
Total	19. 05
Ahtanum:	
Capacity—	
50 to 100 second-feet	11
15 to 50 second-feet	3
Less than 15 second-feet	7
Total	21

(*d*) *Drains* (*Wapato*).—All drains are of the open type with average dimensions of 4 feet bottom width, 1½ to 1 side slopes, and average depth of 8 feet Whilecapacities are large only about 12 miles ever carries more than .600 second-feet. The 121 miles of drains have capacities ranging from 50 to 600 second-feet.

There are no drains on the Toppenish Simcoe or Ahtanum projects.

(Satus) 11.9 miles of drains with capacity of from 10 to 50 second-feet.

(*c*) *Telephones* (*Wapato*).—Fifty-seven miles of telephone lines. These lines serve the Wapato and Ahtanum projects. There are 17 telephone stations.

Six miles of telephone lines serve the Satus project. One telephone station.

There are practically no individual Indian ditches except head ditches on their allotments on the Wapato project.

There may be a few small ditches taking out of Simcoe Creek on land that can be supplied under the Wapato pumping canal taken out years ago by two or three farmers, usually lessees.

13. AREA AND UTILIZATION OF ARABLE AND IRRIGABLE LANDS

Data submitted for one year only.

(*a*) *Utilization of Government project lands, entire project*

Acreage arable [1]	185, 000
Acreage irrigable [2]	103, 386
Acreage irrigated	87, 781
Acreage cultivated	87, 607
Total crop value	$6, 494, 418
Average acreage crop value	$74
Indians farming	178
Lessees farming	682
White owners farming	672

(*b*) *Utilization of land owned by Indians and not leased, Government project farmed by Indians*

Acreage arable	136, 690
Acreage irrigable	58, 376
Acreage irrigated	9, 099
Acreage cultivated	9, 099
Families farming	178
Cultivated per family	51
Total crop value	$414, 668
Acre crop value	$45
Crop value (family)	$2, 295

(*c*) *Utilization of land owned by Indians and leased, Government project, lessees*

Acreage irrigated	44, 696
Acreage cultivated	44, 696
Number of lessees	682
Total crop value	$2, 893, 364
Acre crop value	$63

[1] Acreage arable: Ultimate irrigable acreage when project is completed.
[2] Acreage irrigable: Now under constructed works.

(d) Utilization of land owned by whites

Acreage arable	48,510
Acreage irrigable	37,675
Acreage irrigated	33,822
Acreage cultivated	33,832
Number of owners	672
Total crop value	$3,187,392
Acre crop value	$90

	Wapato	Toppenish Simcoe	Ahtanum	Satus
(a) Utilization of Government project lands:				
Acreage arable	120,000	20,000	5,000	40,000
Acreage irrigable	85,000	4,000	5,000	9,586
Acreage irrigated	76,459	1,787	4,556	4,979
Acreage cultivated	76,459	1,613	4,556	4,979
Total crop value	$6,073,860	$63,999	$163,478	$194,081
Average acreage crop value	$79	$35.80	$35	$38.20
Indians farming	143	13	18	4
Lessees farming	543	21	42	76
White owners farming	629	9	12	22
(b) Utilization of land owned by Indians and not leased, Government project (farmed by Indians):				
Acreage arable	80,200	17,000	4,290	35,200
Acreage irrigable	47,000	2,500	1,290	7,586
Acreage irrigated	7,498	387	854	360
Acreage cultivated	7,498	387	854	360
Families farming	143	13	18	4
Cultivated per family	52	39	47	90
Total crop value	$374,900	$11,010	$15,000	$13,752
Acre crop value	$50	$30	$26	$38
Crop value (family)	$2,600	$854	$1,222	$862
(c) Utilization of land owned by Indians and leased, Government project (lessees):				
Acreage irrigated	38,029	621	2,992	3,054
Acreage cultivated	38,029	621	2,992	3,054
Number of lessees	543	21	42	76
Total crop value	$2,662,030	$19,735	$94,020	$117,579
Acre crop value	$70	$35	$30	$38.50
(d) Utilization of land owned by whites:				
Acreage arable	39,800	3,000	710	4,800
Acreage irrigable	34,415	750	710	2,000
Acreage irrigated	30,932	605	710	1,585
Acreage cultivated	30,932	605	710	1,585
Number of owners	629	9	12	22
Total crop value	$3,036,930	$33,254	$54,458	$62,750
Acre crop value	$98	$55	$76.70	$39

14. PRINCIPAL CROPS, CROP YIELDS AND RETURNS

Crop	Acreage	Average yield	Average price [1]	Total returns
Wapato:				
Alfalfa	28,212	4.8 tons	$11.00	$1,354,176
Apples	2,727	300 boxes	1.50	122,715
Barley	1,793	1.25 tons	25.00	56,031
Cantaloupes	880	200 crates	1.35	23,760
Corn	2,350	60 bushels	.70	98,700
Nursery	422		[2] 900.00	75,960
Oats	823	1 tons	.27	22,221
Onions	525	15 tons	.25	196,875
Peaches	307	400 boxes	.70	85,960
Pears	398	300 boxes	1.35	161,190
Prunes	163	550 cases	.60	53,790
Potatoes	10,614	11 tons	25.00	2,918,850
Wheat	16,265	40 bushels	1.20	780,720
Watermelons	383	12 tons	12.00	55,152
Total				6,006,100
Toppenish Simcoe:				
Alfalfa	521	3.02 tons	9.65	15,184
Apples	21	214 boxes	1.10	4,943
Barley	216	0.60 ton	25.00	3,240
Corn	43	1.90 tons	25.00	2,043
Small fruits	8		50.00	400
Garden	19		50.00	950
Hops	16		100.00	1,600

[1] Average yields and prices for years 1924, 1925, and 1926.
[2] Productive period extends over several years.

14. PRINCIPAL CROPS, CROP YIELDS AND RETURNS

Crop	Acreage	Average yield	Average price	Total returns
Toppenish Simcoe—Continued.				
Oats	109	0.93 ton	$29.00	$2,940
Pasture	174		10.00	1,740
Peaches	1	400 boxes	1.00	400
Pears	13	200 boxes	2.00	5,200
Potatoes	28	5.4 tons	22.50	3,402
Rye	1	0.6 ton	40.00	24
Wheat	586	22 bushels	1.23	6,145
Miscellaneous	26		30.00	880
Total				59,091
Satus (1926):				
Alfalfa	1,453	3.9 tons	12.65	71,692.00
Barley	474	0.55 ton	28.00	7,316.00
Beans	60	Failure		
Cantaloupes	18	185 crates	1.15	3,848.00
Clover hay	100	1.8 tons	11.00	1,980.00
Corn	225	1.6 tons	20.00	4,780.00
Garden	33	Estimated	50.00	1,650.00
Other hay	100	3 tons	10.00	300.00
Nursery	30	Estimated	900.00	27,000.00
Oats	211	0.66 ton	32.20	4,500.00
Onions	207	6.13 tons [3]	[3] 8.70	11,050.00
Pasture	956	Estimated	10.00	9,560.00
Potatoes	138	5.5 tons	28.20	21,645.00
Rye	10	1 ton	40.00	240.00
Wheat	700	24.8 bushels	1.24	21,525.00
Watermelons	37	8.2 tons	8.53	2,635.00
Miscellaneous	80	Estimated	50.00	4,300.00
Total				194,021.00
Ahtanum:				
Alfalfa	1,877	2.5 tons	11.00	51,609.25
Apples	92	231 boxes	1.50	31,878.00
Barley	112	1 ton	30.00	3,372.00
Corn	7	do	30.00	210.00
Corn fodder	34	12 tons	4.00	1,632.00
Garden	1		50.00	50.00
Oats	174	0.7 ton	30.00	3,654.00
Pasture	417		10.00	416.00
Potatoes	354	8 tons	25.00	70,820.00
Wheat	1,331	35 bushels	1.20	55,906.20
Total				219,548.05

[3] Late frost reduced yield.

15. ECONOMIC CONDITIONS AMONG PROJECT FARMERS

Wapato (Indians)

	1924	1925	1926
Number of Indian farms	[1] 623	[1] 679	[1] 666
Number of Indians farming	155	135	143
Livestock	[2] 740	[2] 740	[2] 740
Estimated value of livestock per farm	[1] $500	[1] $500	[1] $500
Estimated value of equipment per farm			$1,000
Acreage farmed by Indians	10,080	6,143	7,498
Acreage farmed per family	65	45	52
Average crop value per acre	$43	$55	$50
Average crop value per family	$2,793	$2,475	$2,600
Construction assessment:			
Total	$50	$50	$50
Annual average	$0.75	$0.75	$0.75
Operation and maintenance assessments	$1.11	$1.10	$1.18
Acres irrigated Indian land leased	32,790	38,099	38,029
Average rental per acre irrigated	$8	$8	$8
Approximate total rental:			
Project	$252,320	$304,792	$304,232
Reservation	$375,000	$420,000	$425,000
Indian land sold (irrigable)			39,800

Average sale prices per acre on entire reservation	$30.40
Total sales price (approximate)	$2,092,166.78
Number Indians receiving payments from timber, agricultural, grazing, leases, etc	1,500
Average per capita payment from above source	$12.00
Average total payment from above sources	$20,000.00
Amount of reimbursable indebtedness	[3] None.
Number Indians receiving rations	7
Indian tribal funds	$50,176.00
Source of tribal funds: Grazing.[4]	

[1] Includes leases.
[2] Sheep and beef cattle are owned by a few Indians but they bring up the average.
[3] None other than irrigation.
[4] Grazing receipts 1926.

Satus.—Only record available separately is for 1927.

Indian farms	76
Indians farming	4
Livestock:	
32 horses	$1,280
22 dairy cows	$880
15 hogs	$200
97 fowls	$48
75 beehives	$750
Total	$3,158
3 automobiles	$2,400
1 truck	$700
Estimated value of livestock per farm	$790
Estimated value of equipment per farm	$975
Acreage farmed by Indians	360
Acreage farmed per family	90
Average crop value per acre	$39
Average crop value per family	$862
Operation and maintenance assessments against Indians:	
Subdivision No. 1, per acre	$0.75
Subdivision No. 2, per acre	$0.50
Average Indian land leased, irrigated—acres	3.054
Indian land sold—do	2,000

Average rental per acre, subdivision No. 1, 50 cents cash and an average of $8 per acre in improvements. Most of raw sagebrush irrigable land is leased for seven years. Subdivision No. 2, estimated at $3 per acre. Sales on reservation not separated by projects.

Ahtanum

	1924	1925	1926
Number of Indian farms	60	60	60
Indians farming	20	21	18
Horses	313	302	250
Cattle, beef	273	148	177
Cattle, dairy	391	667	457
Hogs	341	193	279
Sheep	56	41	43
Poultry	3,000	2,740	3,968
Beehives	46	46	25
Estimated value	$41,720	$47,150	$39,060

Livestock not separated for various classes of farmers.

16. PROJECT OPERATION AND MAINTENANCE

(a) *Organization*

		Salary
Project engineer	per annum	[1] $3,800
Engineer	do	[1] 2,700
Senior clerk	do	[1] 1,800
Supervisor of ditches	do	[1] 2,700
Do	do	[2] 2,700
Do	do	[2] 2,100
Hydrographer	do	[1] 2,100
Instrument man	do	[2] 1,500
Storekeeper	do	[1] 2,100
Timekeeper	do	[1] 1,620
5 ditchriders	per month	[1] 125
15 ditchriders	do	[2] 135
2 ditchriders	do	[1] 135
Machinist	per day	[2] 7
Carpenter	do	[1] 6
Shop foreman	per annum	[2] 2,100

[1] Deductions made for quarters. [2] No deductions for quarters.

		Salary
Garage man	per annum	[2] $1,860
Janitor and night watchman	per month	[1] 125
Motor truck driver	do	[1] 125
Laborer	per day	[1] 4

The above is the organization at Wapato and on the four Yakima Reservation projects. The project engineer, engineer, instrument man, senior clerk, storekeeper, timekeeper, carpenter, machinist, truck driver, shop foreman, garage man and janitor, and night watchman are on construction as well as operation and maintenance, as that part of the organization looks after both operation and maintenance and new construction on all four projects.

One ditch rider is on the Satus project and one is on the Toppenish Simcoe project. There are two ditch riders on the Ahtanum project. One supervisor of ditches looks after the Ahtanum in addition to part of the Wapato project. One supervisor of ditches looks after the Satus as well as part of the Wapato project. One laborer at $5 per day and two laborers at $4 per day work continually on cleaning drainage canals. Other laborers and help are employed when necessary in the spring and fall and at other times when necessary.

Ditch riders are employed on the Wapato project and are employed all the year in most cases. When we anticipate a change in ditch riders they are laid off at the close of the irrigation season and the new ones put on in February or March. There are usually two or three in this class. The ditch riders are used as foremen and straw bosses on ditch cleaning and repairs during the nonirrigation season. The season is such that work can be carried on all winter.

Practically all the ditch riders use their own automobiles as do two of the supervisors of ditches. The 18 ditch riders patrol an average of 26 miles of canal, make 140 deliveries of water to an average of 4,330 acres of land. One of the 18 ditch riders looks after and regulates the Wapato head gate, and another regulates the four main lateral head gates and distributes water to 853 acres besides.

(b) Annual expense, Wapato unit

	1926			1926	
	Maintenance	Operation		Maintenance	Operation
Superintendence	$200.60	$296.04	Hydrography		$2,700.00
Accounting	3,005.50	1,907.52	Ditch riders' salaries	$21,240.80	26,003.05
Engineering	480.10	608.00	Other labor	19,182.34	2,202.06
Headquarters maintenance	1,130.00	1,003.10	Material and supplies	4,011.00	1,508.90
Automobiles	1,070.80	1,609.04	Total	50,262.24	38,018.35
Telephones	40.00	180.64			

Total operation and maintenance	$88,280.59
Average per acre	1.16

The above is a detailed cost of the operation and maintenance segregated from the records. Estimates are given where actual figures were not available. The total is the actual operation and maintenance for 1926.

	1925	1926	1927
Operation and maintenance:			
Wapato unit—			
Costs	$70,851.72	$88,280.59	$112,531.47
Collections	70,790.00	85,164.43	90,893.00
Ahtanum unit—			
Costs	6,769.88	5,446.49	6,346.37
Collections	5,696.76	6,055.21	5,228.51
Satus unit—			
Costs		7,600.68	7,105.22
Collections		2,491.90	3,097.51
Toppenish-Simcoe—			
Costs	1,792.45	1,944.51	2,597.90
Collections		876.25	810.50

[1] Deductions made for quarters.

[2] No deductions for quarters.

(c) Comparison with neighboring irrigation projects

	Wapato	Sunnyside
Elevation	750 to 1,015 feet	500 to 900 feet.
Growing season	Apr. 1 to Oct. 15	Apr. 1 to Oct. 15.
Soil	Volcanic ash	Volcanic ash.
Water supply	Same source	Same source.
Water service (duty)	4.2 acre-feet	3.4 acre-feet.
Crops grown	Same	Same.
Per acre crop value (1926)	$72.20	$78. 64.[1]
Quality of construction	Same	Same.
Total construction cost	$6,000,000 [2]	$4,267,066.[3 4]
Annual per acre assessment	$2.50 [5]	$4.[5]
Annual per acre operation and maintenance, 1926	$1.10	$1 to $3.
Per cent of irrigable land cultivated	92 per cent	88 per cent.

	Toppenish-Simcoe	Wapato
Elevation	960 to 1,200 feet	700 to 1,015 feet.
Growing season	Same	Same.
Soil	Volcanic ash	Volcanic ash.
Water supply	Inadequate	Adequate.
Crops grown	Similar	Similar.
Acre crop value	$35.80 (1926)	$72.20 (1926).
Quality of construction	Wooden structures	More permanent.
Construction cost, including equipment	$161,535.22	$300.
Annual acre construction assessment	None	$2.50.
Annual operation and maintenance assessment	$0.50 (1926)	Average $1.10 (1926).
Per cent irrigable	25 per cent under ditch	92 per cent.

	Ahtanum	Tieton
Elevation	1,000 to 1,700 feet	1,100 to 2,200 feet.
Soil	Similar	Similar.
Water service	Shortage after June	Slightly inadequate.
Crops grown	Practically same	More orchards.
Acre crop value	$35 to $40	$89.18.
Total construction cost	$89,404.83	$3,441,005.
Annual acre construction cost	$1	$5.
Annual acre operation and maintenance	$1.25	$2.75.
Per cent irrigable land construction	92 per cent	89 per cent.

[1] Estimates are figures, hay in stack, fruit without boxes and potatoes without sacks.
[2] Includes storage and estimated amount to complete, also drainage.
[3] Includes construction and storage.
[4] Drainage, State drainage district, $28 additional cost.
[5] Wapato, 20 annual installments, Sunnyside 2 per cent 4 years, 4 per cent 2 years, and 6 per cent 14 years.

17. CONSTRUCTION AND OPERATION AND MAINTENANCE COSTS AND COLLECTIONS

(a) Wapato construction cost to June 30, 1927

1. Funds collected for construction, repayments and reinvested	$566, 568. 28
2. Appropriated by Congress and nonreimbursable to U. S. Treasury	76, 251. 01
3. Authorized by Congress of tribal moneys and nonreimbursable to tribal funds	19, 025. 50
4. Appropriated by Congress and reimbursable to U. S. Treasury	2, 596, 497. 82
5. Total construction cost to June 30, 1927	3, 258, 340. 61
6. Chief Engineer's costs to June 30, 1927	32, 977. 39
7. Inventory on hand to June 30, 1927	74, 400. 11
Total investment of United States on account of construction	[1] 3, 365, 718. 11

[1] Does not include $635,000 (nonreimbursable) appropriated for purchase of reservoir water under act of Aug. 1, 1914. Also unpaid amount due Bureau of Reclamation on purchase of 250,000 acre-feet storage water which shows as a United States investment in that bureau.

1. There has been $737,098.59 of these moneys collected to June 30, 1927, and $170,530.31 were on hand unexpended at that date.
2. Funds expended from congressional appropriation and not affected by the act of August 1, 1914, therefore nonreimbursable by act of December 21, 1904 (33 Stat. L. 595).
3. Tribal funds expended on project and not reimbursable.
4. All other moneys used exclusive of nonreimbursable and made reimbursable by general law.
5. This amount is net costs of construction and does not include "Inventories" on hand not used amounting to $74,400.11 which were purchased partly out of construction funds and partly out of operation and maintenance funds. Also the amount of $32,977.39, Chief Engineer's charges, which is reimbursable.
6. This is not all chargeable to construction costs, but what part should be is not known.

Construction cost to June 30, 1927

Ahtanum:	
Reimbursable moneys expended	$94, 241. 54
Less inventory	127. 42
Total construction cost	94, 114. 12
Toppenish-Simcoe:	
Reimbursable moneys expended	163, 121. 69
Less inventory	19, 289. 39
Total construction cost	143, 823. 30
Satus:	
Reimbursable moneys expended	177, 647. 87
Less inventory	8, 036. 76
Total construction cost	169, 611. 11

(*b*) *Collection of construction cost—Wapato.*—Collections are being made under the act of May 18, 1916. The act of February 14, 1920, and the act of May 25, 1922, reduces annual payments from $5 to $2.50 per acre, and provides for a lien on Indian lands to be paid for from tribal and other funds. Departmental order of March, 1921, fixed storage water payments for Indian lands at $1.50 per acre for all class B lands.

Total construction assessments to June 30, 1927	$764, 727. 55
Per-acre annual construction assessments:	
Indian, class B land	1. 50
White, both A and B land	2. 50
Total construction collections to June 30, 1927	737, 097. 59
Total construction collections to June 30, 1927:	
Indians	136, 207. 05
Whites	600, 890. 54
Total construction delinquencies to June 30, 1927	[1] 27, 629. 96
Penalties on delinquencies and notes	[2] 14, 961. 45
Rate of penalties on certain annual assessments—per cent	5

Collection of construction cost

Ahtanum:	
Total construction collections to June 30, 1927—	
Indian-owned land	$541. 30
Indian land leased	3, 447. 20
White-owned land	877. 40
Total construction collections to June 30, 1927	4, 865. 90

No construction assessments made on Satus and Toppenish-Simcoe project lands.

[1] Made up largely of a few outstanding notes and those guaranteed by the superintendent for Indian lands.
[2] Included in total collections.

(c) *Operation and maintenance cost to June 30, 1927*

Wapato:	
Reimbursable money expended	$156,661.39
Collections made and expended	979,578.65
Total cost to June 30, 1927	1,136,240.04
Ahtanum:	
Reimbursable money expended	16,237.76
Collections made and expended	57,878.09
Total operation and maintenance costs	74,115.85
Toppenish-Simcoe: Reimbursable moneys expended	19,298.39
Total operation and maintenance costs	19,298.39
Satus:	
Reimbursable moneys expended	10,806.36
Collections made and expended	3,899.54
Total operation and maintenance costs	14,705.90

(d) *Operation and maintenance collections to June 30, 1927—Wapato.*—The irrigable area under the system is used as basis for computing the per acre annual operation and maintenance assessment. No deductions are made for roads and buildings. On new sagebrush land the actual area irrigated is used the first year; after that the area irrigable.

Operation and maintenance assessments are made for the year payable in advance.

Assessments are as follows:

	Per acre
Class A land (practically one-half of the land)	$1.00
Class B land (practically one-half of the land)	1.35

All are payable in advance, on or before the delivery of water, April 1 being the approximate date. The 35 cents per acre was the storage charge the Indian Service collects for the Bureau of Reclamation and varies annually.

Operation and maintenance collections are enforced by the nondelivery of water until payments are made. This method also applies to construction charges as well.

Operation and maintenance collections are made from all water users alike, both Indians and whites.

No special method of estimating rate of operation and maintenance. It was fixed at $1 per acre 14 years ago when the acreage was 32,000 acres, and we have been able to get along nicely on that since. Two or three times Congress has made a small appropriation of 6 to 10 cents per acre, without it being requested from the field. We have always had a good-sized balance to carry over from one year to another.

If the work to be done, repairs, betterments, etc., is in excess of our funds, it will be recommended that the operation and maintenance rate be increased, which has not been necessary on the Wapato project to date.

The present method is satisfactory.

Total operation and maintenance assessments to date (including storage operation and maintenance)	$1,051,233.37
Total operation and maintenance collections (including storage)	1,045,611.99
Total operation and maintenance collections:	
From Indians	41,759.16
From white owners	354,205.36
From lessees	593,287.01

Storage all on same basis not segregated.

Total operation and maintenance delinquencies to date	$5,621.38
Penalties (no water delivered)	None.

	1924	1925	1926
Per acre operation and maintenance assessment:			
On Indian land not leased	$6,587.91	$9,647.31	$8,250.05
On Indian leased land	36,122.18	38,099.00	38,752.85
On white owned land	27,069.40	29,048.00	29,650.10
Operation and maintenance collections:			
On Indian land not leased	6,587.91	3,643.00	10,198.78
On leased Indian land	36,122.18	38,099.00	38,752.85
On white owned land	27,069.40	29,048.00	29,650.10
Operation and maintenance delinquencies:			
Indian land not leased	None.	6,004.31	1,948.73
Leased Indian land	None.	None.	None.
White owned land	None.	None.	None.

[1] Operation and maintenance collections to June 30, 1927, $1,045,611.99.

Ahtanum.—Operation and maintenance collections to June 30, 1927, $69,002.11. Actual area farmed by irrigation varies between 4,500 and 4,800 acres, depending on prospects for water supply.

Operation and maintenance assessments are made for one year, April 1, or on or before water is delivered. No water is delivered until payments are made except where superintendent guarantees payment on Indian farmed land. Collections are made from all water users. The assessment is made for the ensuing year and takes into consideration the estimate of necessary repairs and operation costs for that year. The operation and maintenance assessments were raised from $1 to $1.25 several years ago.

Total operation and maintenance assessments to date	$70,405.04
Total operation and maintenance collections to date	69,002.11
Total operation and maintenance collections:	
From Indians	10,397.51
From white owners	17,071.47
From lessees	41,533.13
Total operation and maintenance delinquencies to date	1,402.93

No penalties.

	1924	1925	1926
Per acre operation and maintenance assessment:			
Indian land	$1.25	$1.25	$1.25
Indian land leased	1.25	1.25	1.25
White-owned land	1.25	1.25	1.25
Operation and maintenance delinquencies:			
Indian land not leased	None.	[1] 705.84	[1] 85.20
Indian leased land	None.	None.	None.
White-owned land	None.	None.	None.

[1] Superintendent guarantees payment for Indians out of their funds due them June 30. Payment to this office at later date, so it shows as a delinquent.

Toppenish-Simcoe.—The area actually irrigated is used for the basis of computing operation and maintenance assessments, which are made for one year on or before delivery of water. To enforce collection, delivery of water is refused. Operation and maintenance collections are made from all irrigators. The rate is 50 cents per acre pending time of completion of project, when more water will be available. The present method is considered fair.

Total operation and maintenance assessments to date	$1,756.75
Total operation and maintenance collections to date	1,686.75

Difference in above amounts is accounted for by superintendent of reservation guaranteeing payment of operation and maintenance for Indians.

Operation and maintenance collections:	
From Indians	$511.00
From lessees	453.00
From white owners	722.75

Operation and maintenance delinquencies to date, only the $70 guaranteed by superintendent. No penalties.

Per acre operation and maintenance assessment, first collection made 1926:

Indian farmers	$0.50
Lessees	.50
White owners	.50
Operation and maintenance collections:	
Indians	511.00
Lessees	453.00
White owners	722.75
Operation and maintenance delinquencies:	
Indians	35.00
Lessees	35.00
White owners	None.

No penalty except nondelivery of water.

Satus.—The actual area to be irrigated each particular year is used as the basis for operation and maintenance assessments, which are made for yearly periods on or before water is delivered. To enforce collections the delivery of water is refused. Assessments are made on all irrigators. It is hoped to make the Satus self-supporting by the fourth season after beginning irrigation.

Operation and maintenance assessments to date equal the collections, or $5,867.16. Collections practically 100 per cent, as superintendent guarantees payment of Indian assessments from their funds.

Operation and maintenance collections:	
From Indians	$207.50
From white owners	2,262.95
Lessees	3,396.41

No operation and maintenance delinquencies. No penalties.

	1925	1926
Per acre operation and maintenance assessments:		
On Indian land not leased	$0.25	$0.50
Indian land leased	.25	.50
On white owned land	.25	.50
Operation and maintenance collections:		
On Indian land not leased	5.00	15.00
Indian land leased	146.00	1,636.45
White owned land	126.25	1,118.20
Operation and maintenance delinquencies	None.	None.

No rate of penalties other than the nondelivery of water.

18. PROJECT DEFECTS, PROBLEMS, AND COMPLAINTS

The ultimate irrigable area of the project has been considered as 120,000 acres, and this acreage is used in much of the legislation for a number of years. It is claimed that a large part of this project is among the very best lands of the Yakima Valley. Some of the land under the pumping units will make fine fruit farms. These statements undoubtedly are very well founded, and we believe that as a project farmed by white settlers of the class found in the Yakima Valley, the project could be made one of the best in the State of Washington.

The primary purpose of the development of the irrigation system was to irrigate the allotments of the Indians in order to permit each able-bodied Indian owning an allotment and able to farm to become self-supporting through his own efforts. In other words, the Government intended the land and water to be an instrument with which the Indian would eventually become a self-supporting citizen, reimbursing the Government for moneys spent in providing this instrument, all from his own labors. The early development of the project was along these lines, but gradually the white man was permitted to purchase allotments, until his holdings are now 33.2 per cent of the area of the project. Leasing of the Indian-owned lands to white farmers has been practiced to a very large extent and at the present time 89.3 per cent of the Indian-owned land under cultivation within the project limits is leased. The Indian owners have been able to lease most of their farm lands at an average price of $8 per acre per year. They have no taxes to pay, the white farmer paying the operation and maintenance charge. The only deduction from the rental money is $1.50 per acre construction charge on class B land. The allotments are mostly 80 acres, 40 of class B land and 40

of class A lands, which would give the Indian holding such an allotment $580. This is an unearned income sufficient to support the average Indian in his present stage of civilization without labor upon his part.

The records of the project and agency offices give the acreage farmed by Indians as 4,661 acres in 1927, but from our observations while on the project we conclude that the acreage reported is considerably exaggerated. It is locally known that there are private understandings between some Indian owners and Japanese whereby the Japanese do the farming, but under the guise of being the hired man. This is due to the State law prohibiting Japanese from leasing lands. We had several examples pointed out to us as Indian farmers, though we saw Japs doing the actual work on the farms in question.

Where we found the most Indians farming was on the marginal lands that could not be leased or that would bring very low rentals. For the year 1927 there were 43,523 acres of Indian owned lands farmed. It was reported that there were 143 Indians farming and 543 lessees farming Indian lands on the project. It is not known what portion of the leased lands were heirship lands or belonged to minors, old or disabled Indians, but figuring the maximum allotments of 80 acres or assuming that an Indian family was capable of caring for the same area as a lessee, the Indian owned lands would care for 500 to 600 Indian families or two-thirds of the population of the reservation with four to the family. As there are several smaller projects on the reservation that provide for a small number in farming, and as some of the present Indian population sold their land to whites, there would seem to be no immediate pressing need to develop more land in order to furnish the Indians as a whole on this reservation with the means with which to be self-sustaining. As already pointed out the community furnishes plenty of opportunity for employment of the Indians. Also that at the present time only seven out of a population of 3,024 need Government rations,—a remarkably small number.

The problem at present, looking at it from a purely Indian welfare point of view, is, how can the instrument already ereated be made to serve the Indian in working out his own destiny, instead of enabling him to live in idleness on the income from property which the Government has created for him.

As the project has developed, the Indian has accomplished less in farming, and as long as he is permitted to lease his land and live upon the income he will not develop as a farmer. Such a system would soon induce even the white farmer to become dependent upon the Government. There seems to be no reason for the Government to continue developing Indian lands for the Indians to lease to the whites, while the Government holds the bag.

A policy which would compel the Indians, if they do not work the land provided them to pay a good share of the income from leasing to the United States Treasury in order to repay the Government for its expenditure, might act as stimulant to more farming by the Indians.

There is another side to the problem that must be taken into consideration.

The land, as has been pointed out, is very productive. Whites have been allowed to purchase Indian allotments amounting to one-third of the area of the project. Whites will continue to lease the larger part of the Indian land for many years. Public opinion is urging the completion of the project and money has already been appropriated for beginning the construction of the first pumping unit. The white purchaser must be protected in his rights as well as the Indian allottee, who pays no taxes, and pays only a small part of the construction charge compared to the white owner, while 90 per cent of his land is used for commercial farming.

The pressure for new development of the pumping units is largely for the purpose of its use by white people either through ownership of lands or the profits of commercial farming of Indian lands, and not for the purpose of furnishing Indian owners with a means by which they may earn a living by their own toil.

Your advisers are of the opinion that these improvements and extensions will and should go ahead, but we are also of the opinion that some very definite plan should be devised for handling these lands in order that they may be put to their best use and that if the Government's expenditure is to contribute to commercial farming, more definite plans for construction repayments should be determined before any further consideration is undertaken. Under the present leasing system, 3 to 5 years is the usual length of the lease, with 10 years as the maximum. These short periods tend to deplete soil fertility and provide no incentive to maintain crop production or to use the land for more intensified agriculture or horticulture requiring longer periods of time.

The project as it is now developed has approximately 77,500 acres that should be paying construction charges (class A Indian owned not paying) and are now

practically all paying operation and maintenance. There are about 22,500 acres, making up the balance of the 100,000 acres in the gravity part of the unit, that are either partly alkalied, covered with salt grass, insufficiently reclaimed, subject to overflow, rough or unfit soil.

The lateral system is constructed to most of this land and drainage canals run through it, but in some instances these are not deep enough to drain satisfactorily. Some of this land can be reclaimed; other portions are doubtful. Some pasture is secured yielding some rental, but in this State it pays no construction or operation and maintenance charges. Unless some more definite plan is worked out for its reclamation, its reclaiming will be slow. Because of the construction already done to serve this land and the comparatively small amount additional necessary to expend to reclaim at least a part of it, your advisors are of the opinion that this should be undertaken before other new construction is undertaken.

It is estimated that there are 20,000 acres under the two pumping units. Under the first unit which has been approved for construction, there are 10,880 acres.

The present estimate of cost of this construction already approved is $533,530, which is a tentative figure. It may be well to point out that in the hearing on the appropriation bill for 1928, it was stated that the cost of developing the entire pumping units and canals for 20,000 acres would be $520,000, in comparison to the above amount for 10,880. The Indian office explains this difference by stating that this is the amount of money that Congress will have to appropriate, and that the balance required will be obtained from repayments on construction charges, all of which are Government funds. The total cost of providing the necessary irrigation works for the 20,000 acres (now given as 21,840 acres) will be close to $1,500,000.

The acreages given above were secured by sketching the canal location on the topographic maps and taking the acreage under it as the irrigable acreage. The slope varies from 30 to 80 feet per mile. No soil survey or classification of irrigable acreage has been made. In the light of experience on both reclamation and private projects during the past 20 years, no project or unit of a project should be undertaken until such a survey and classification has been made. No engineer can arrive at his per-acre costs until he has definite data as to the ultimate acreage that will be reclaimed. This is just as essentially a part of the development as estimating the detailed costs of structures or any of the constructed works.

The project thus far brought under cultivation has been very fortunate in the fact that there was very little waste land and the lack of a soil survey and land classification has made very little difference. But a survey is necessary for the remaining development.

The cost of the project to date is $3,365,718.11 and in addition thereto there remains $1,365,000 (tentative estimate) to pay the Bureau of Reclamation for reservoir water, under memorandum of agreement of 1921 ($260,000 having already been paid). It is estimated by the project officials that it will require $1,244,000 (tentative figure) which seems much too low in view of recent estimated cost of pumping units, to complete the project. This makes a total cost of $6,234,718.11 less $19,023.50 nonreimbursable tribal moneys and $76,251.01 appropriated by Congress, and expended prior to March 5, 1904 (see act December 21, 1904), making a net reimbursable cost of $6,139,443.60, or $51.16 per acre if it is possible to serve the whole 120,000 acres with the works now built and the expenditure contemplated. Because of the tentative data as to final acreage and cost to complete it may be well to point out that when detailed information is obtained, the per-acre cost will probably be considerably increased. The present diversion duty of 6.4 second-feet per acre, if maintained when the whole project is brought under cultivation, will call for an increased water supply from storage, larger canals, and increased drainage facilities. There is no doubt that more water is being used than is required by the land and this excessive use is being encouraged by the management in order to build up the ground water early in the season for use later in the year. The wisdom of this practice we believe to be very questionable. It tends to leach out the soil fertility. It is a known fact that the practice of allowing extravagent use of water in the early stages of a project development creates a precedent and a demand on the part of the water user that is very difficult to correct.

This unit of the project is the most productive one among the Indian projects and it has also repaid more of its construction costs than any other, but the Indian-owned lands have paid a comparatively small amount and that only on the class E lands.

There seems to be no sound reason why the land of all able-bodied Indians and heirship lands where the same are being leased should not be paying the

Government for the cost of constructing the irrigation works. On account of the fact that the application of water to the land has created an earning asset for the Indian, he should be made to feel the obligations of repaying the cost, and especially so where the earning power is in no way created by the individual Indian.

The Ahtanum unit consists of about 5,000 acres on the south side of Ahtanum Creek from which it receives its water supply. The land is served by a main canal diverting from the creek 14 or 15 miles above its junction with the Yakima River. The first construction of the present canal was done in 1908. Some of the land had previously been irrigated by these small Indian ditches, the oldest of which probably dated back to 1860.

The canal has a maximum capacity of about 70 second-feet, but only during the early part of the growing season is there sufficient water to fill it. Normally after the last of June the water supply falls off until it is reduced to 8 second-feet and in very dry years to 5 second-feet.

Ahtanum Creek is the northern boundary of the Yakima Reservation. There is considerable privately owned land on the north side of the creek that receives its water supply also from the same creek.

In 1908 an agreement was entered into between the Government and the owners of water rights for the privately owned land to limit the use of the waters of Ahtanum Creek to 25 per cent for the Indian land and 75 per cent for the privately owned land. The above agreement was made by W. H. Code, then chief engineer of the Indian irrigation service and approved by the Secretary of the Interior. The contention of some is maintained that under the principles laid down in the Winters case that both the Secretary and the chief engineer of the Indian service exceeded their authority in limiting the Indian lands to the use of any portion of the stream short of a sufficient amount for the Indian irrigable land.

This would seem to be a similar case to that of the Wapato unit whereby the Secretary of the Interior limited the Indian lands of that unit to 147 second-feet of the low-water flow of the Yakima River. Whether the Secretary of the Interior has the authority to limit the Indian lands to a certain amount of the stream flow is a legal one that can not be settled short of the courts. However, in the case of the Wapato unit, Congress seems to have conceded that the Secretary had the authority when they made an appropriation to purchase sufficient storage water to give a flow of 720 second-feet. We see no reason why this case should be treated any differently than the Wapato case provided storage can be developed at a reasonable cost. The project management claims that a small storage reservoir can be developed at a cost of about $60 per acre distributed over the 5,000 acres of the project. This, however, will not then furnish a complete water supply as the storage would only give 0.44 acre-foot per acre in the reservoir with something less at the land. It would seem that this is insufficient to justify the cost, and unless something else that will furnish a more ample supply within a reasonable cost the unit should be operated as at present.

The water supply has enabled the Indians to produce crops during the years 1924 to 1926 of an average annual value of $29 per acre; white lessees, $35 per acre; and white owners, $72 per acre. On the Wapato unit the average returns for the same years are Indians, $49 per acre; white lessees, $74 per acre; and white owners, $105 per acre.

With an ample water supply there is no reason why the Ahtenum project would not make as good a return as the Wapato project lands.

The project reports show that the Indians are farming 854 acres out of a total of 4,556 acres farmed during the year 1927. From our observations in going over the project this is more optimistic than the facts warrant. In our inspection of all the units of the Yakima Reservation one Indian was actually found working in the field although it was the time of year that the crops were being taken care of by the white farmers. The Yakima Valley furnishes an opportunity for the Indian to labor almost any time of the year from general farm laborer to the picking and packing of fruit, hops, etc. With this opportunity to work and the possibilities to lease his lands to whites at a good rental, a few more years will see even a further contraction of the Indian farming. This unit as well as the other units on the Yakima Indian Reservation have been as a whole a failure as far as making the Indian a self-supporting individual by his own toil in the cultivation of his land. He has been able to secure an income from the rental of his land to support himself in idleness. As white men's projects they have been successful producers. Further development of these projects should be predicated upon the assumption that the improvements are for the ultimate use of the latter.

The cost of this unit to June 30, 1927, are $94,241.54, of which only $833.60 has been paid, leaving $93,407.94 due the Government.

The per acre cost at the present time amounts to $18.68 based upon an ultimate area of 5,000 acres. The first construction collections were assessed in 1927 at the rate of $1 per acre. There is no reason under the present conditions why these lands can not continue to pay at this rate, until such time that works may be constructed to supplement their water supply.

The project has been under operation since about 1909, and now has 4,556 acres in cultivation. The total cost of operating and maintaining the unit to June 30, 1927, was $74,115.85, and the amount assessed against the land has been $70,405.04, leaving an unassessed balance of $3,710.81.

The assessed amount of $70,405.04 has been collected to the extent of $69,002.11, leaving an unpaid accrual of $1,402.93.

The above figures are based upon a statement furnished by the supervising engineer's office under date of January 3, 1928. Three different statements were submitted. Two by the supervising engineer's office to your advisors and one by the Washington office obtained from the supervising engineer's office, alleging different costs for construction and operation and maintenance. The Washington office report shows the operation and maintenance costs to be $99,910.27, a difference of $25,794.42.

Taking the several different reports the total costs of construction, operation, and maintenance are practically the same, showing that no definite policy has been adopted as to the class of expenditures that belong to the construction account and those belonging to operation and maintenance. There is a tendency on the projects to charge the replacement of old structures to betterments which are thrown into the construction account. It must be realized that this class of betterment work will continue to go on for a great many years and should be taken care of through the operation and maintenance funds and paid for as a going expense.

The Washington office has no check on how the distribution of these costs are made so long as projects are under construction as well as operation and maintenance. A definite policy on this matter should be adopted and all projects made to conform to it.

The present operation and maintenance rate on the Ahtanum project is $1.25 per acre per year based upon the irrigated acreage. This rate should be increased to $1.50 per acre per year until the deficit indicated above is wiped out and the Federal Treasury repaid the reimbursable funds that have been used in the operation and maintenance of this project.

Satus unit.—This unit consists of approximately 40,000 acres on the Yakima Reservation on the west side of the Yakima River and south of Toppenish Creek, and adjoining the Wapato unit.

The drainage system of the Wapato unit, which at present gives a return flow of 200 to 500 second-feet, will furnish one of the principal sources of water supply. Satus Creek, which cuts through the upper end of the project, giving considerable water supply until June 1, will furnish the balance of the water supply mainly through storage, if development is to be made for the entire tract.

The development up to the present time consists of two separate tracts, the first receiving water from the Wapato drains and the second from the flood waters of Satus Creek. About 5,000 acres are now being irrigated in both tracts. The first construction on this unit was done in 1924, so that farming is just getting started under this project. The first tract above mentioned is served by gravity, but on the second tract a pump lift of 25 feet will be required to deliver the drainage water into the canals covering those lands. The water from Satus Creek is delivered by gravity.

The general topography of the tract has a rather uniform slope toward the river and in the direction of the valley, but parts of it are rough and will require considerable labor and expense to bring it into good working condition. The tract shows signs of alkali in various parts and undoubtedly will require a well-planned drainage system as it is brought under irrigation.

It is claimed that there are 9,586 acres that can now be served from the present constructed works. This is a unit that is in the making, and up to the present time (June 30, 1927) the Government's net investment is $186,432.61.

The main line of the Northern Pacific Railroad runs through the unit. Climatic and economic conditions are similar to those of the Wapato unit for lands in the same state of development; and, in fact, this project can be considered as an extension of the lower end of the Wapato unit. The remarks and discussion made concerning the Wapato unit are, in a large measure, applicable to this unit.

We believe that a unit can be developed here that can be made to repay its cost without loss to the Government, but in order to do so it will be necessary to go into its future development in a businesslike way with the lessons that have been brought out by the troubles of other projects during the past 15 or 20 years.

Toppenish Simcoe unit is west of and adjoins the main Wapato unit. It is claimed to consist of 18,000 to 20,000 acres, 17,000 of which are owned by Indians and 2,500 to 3,000 acres are in white ownership.

The water supply is from Toppenish and Simcoe Creeks, both of which are what are sometimes termed flood-water creeks. Neither creek will furnish much after the 1st of June and such flow as normally exists after that date is used by small ditches that have used the water for a number of years. It will, therefore, be necessary to depend upon storage for the major portion of the water supply. A possible reservoir site is located upon Simcoe Creek just above the lands to be irrigated. A feeder canal from Toppenish Creek will supplement the the Simcoe Creek water.

A comparatively small amount of land is under cultivation. In 1926 which was a dry year, 1,621 acres were farmed. The construction thus far accomplished remains unproductive due to the fact that the only water available is flood water prior to June 1, and it will require a considerable expenditure of funds before reservoir water can be made available.

The canal construction preceded the construction of the reservoir largely as a war measure in the attempt to grow more wheat.

The construction cost to June 30, 1927, was $156,362.08, including the chief engineer's expense and inventories, operation, and maintenance, $19,298.39, of which $1,686.75 has been collected leaving a net investment of $173,973.72. It is estimated that it will cost $1,650,000 to complete the construction on this unit.

For the past two years an operation and maintenance collection of 50 cents per acre on the land irrigated has been made. This is less than the cost of the services, but for the amount of water received it is about all that the water user can afford to pay.

A ditch rider is hired the year around at $135 per month which amounts to $1 per acre for this one employee. To this must be added some additional labor and the cost of material for maintenance, so that it is readily seen that the cost of service for a couple of months' water supply is high. It would appear that there is no necessity for maintaining an all-the-year-round employee under these conditions.

Due to the fact that a comparatively small acreage is under cultivation and that it will require a considerable expenditure before any additional lands can be brought under cultivation, nothing further on this unit should be undertaken until the Wapato and Satus units are fully developed and the land all put to production purposes.

The general discussion of the Wapato and Satus units are applicable to this unit, and especially those in regard to complete investigations, soil surveys, and classification of lands.

Toppenish Simcoe unit is west of and adjoins the main Wapato unit. It is claimed to consist of 18,000 to 20,000 acres, 17,000 of which are owned by Indians and 2,500 to 3,000 acres are in white ownership.

The water supply is from Toppenish and Simcoe Creeks, neither of which supplies much water after the 1st of June. A possible reservoir site is located on Simcoe Creek. A feeder canal from Toppenish Creek will supplement the Simcoe Creek water. A feeder canal from Toppenish Creek will supplement the Simcoe Creek water. One thousand eight hundred and twenty-one acres were farmed in 1926. The construction thus far accomplished remains unproductive due to the inadequacy of the water supply. The canal construction preceded the construction of the reservoir largely as a war measure in the attempt to grow more wheat.

The construction cost to June 30, 1927, was $156,362.08, of which $1,686.75 has been collected, leaving a net investment of $173,973.72. It is estimated that it will cost $1,650,000 to complete the construction of this unit.

A ditch rider is hired the year round at $135 per month, which amounts to $1 per acre for this one employee. To this must be added some additional labor and the cost of material for maintenance, so that it is readily seen that the cost of service for a couple of months' water supply is high. It would appear that there is no necessity for maintaining an all the year round employee under these conditions. Due to the fact that a comparatively small acreage is under cultivation and that it will require a considerable expenditure before any additional lands can be brought under cultivation, nothing further on this unit should be

undertaken until the Wapato and Satus units are fully developed and the land all put to production purposes. The general discussion of the Wapato and Satus units are applicable to this unit, and especially those in regard to complete investigations, soil surveys, and classification of lands.

Respectfully submitted.

PORTER J. PRESTON,
Engineer, Bureau of Reclamation.
CHARLES A. ENGLE,
Supervising Engineer, Bureau of Indian Affairs.

Representative FREAR. I think it would be very important for this committee, if it is possible to do so, to have some of these most important hearings printed at an early day so that the record will be accessible to the people. It is difficult to get hold of some of the hearings. They would be helpful in giving a comprehensive understanding of the situation.

Mr. GRORUD. I also have here a tabulation or statement entitled "Indian irrigation service statement of costs, fiscal year 1928, and totals to June 30, 1928," which I ask that it be made a part of the record.

The CHAIRMAN. Very well; without objection, this statement is admitted and ordered printed as part of this hearing.

Indian irrigation service statement of costs, fiscal year 1928, and totals to June 30, 1928

	Costs for the fiscal year 1928				Total costs to June 30, 1928							
	Preliminary surveys and construction costs	Operation and maintenance costs	Chief engineer's charges	Total costs for year	Preliminary surveys and construction costs	Operation and maintenance costs	Chief engineer's office charges	Value inventories on hand	Less construction repayments	Less operation and maintenance repayments	Net investment of the United States	Costs not irrigation
District No. 1												
Colville Reservation:												
Curlew project					$2,054.91						$2,054.91	
Little Nespelem		$1,415.74	$2.55	$1,418.29	19,794.79	$13,739.30	$385.09	$722.00	$12.50	$1,177.65	33,451.03	
Nespelem and miscellaneous		2,759.00	4.97	2,763.97	38,837.35	29,396.57	798.52				69,032.44	$411.93
San Poil		1,530.95	2.76	1,533.71	9,540.10	1,530.95	75.30	200.96			11,347.31	
West Okanogan					95,000.00	11,876.12			4,583.55		102,292.57	
Fort Lapwai Reservation					2,493.84		16.11				2,509.95	1,592.82
Klamath Reservation:												
Modoc Point project		3,828.93	6.89	3,835.82	193,415.34	66,362.34	729.23	3,289.25	1,904.50	1,530.90	260,360.76	
Sand Creek project		2,510.77	4.52	2,515.29	25,770.60	5,368.86	90.47	2,051.95	5,430.30	7,545.56	20,906.02	
Miscellaneous projects		41.00	.07	41.07	56,787.80	3,292.09	970.42	600.00			61,650.31	
Lummi Drainage project	$1,342.40		2.42	1,344.82	26,449.26		191.27	3,283.54			29,924.07	
Muckleshoot Reservation					1,468.21						1,468.21	
Spokane Reservation					1,513.14		16.82				1,529.96	
Umatilla Reservation					1,622.97		7.43				1,630.40	504.74
Warm Springs Reservation					7,075.09		21.23				7,096.32	
Yakima Reservation:												
Atanum project		8,388.81	15.10	8,403.91	67,468.12	108,129.61	1,042.33	51.87	1,291.05	74,810.79	100,590.09	
Sataas project		5,406.43	9.73	5,416.16	168,683.42	19,877.87	1,236.06	7,699.37		10,037.76	187,458.96	
Toppenish-Simcoe		4,128.96	7.43	4,136.39	142,698.29	21,974.98	1,132.44	11,059.42		2,664.25	174,200.88	
Wapato	139,328.06	93,880.86	419.77	233,628.69	4,736,934.29	1,255,595.23	33,397.16	115,390.62	842,012.39	1,154,289.24	4,145,015.67	842.68
Miscellaneous power site investigations					4,293.05		28.73				4,321.78	47.79
Administration								102.72			102.72	
Total	140,670.46	123,891.45	476.21	265,038.12	5,601,900.57	1,537,743.92	40,138.61	144,451.70	855,234.29	1,252,056.15	5,216,944.36	3,399.96
District No. 2												
Bannock Creek						1,243.96	10.47				1,254.43	
Blackfoot office					7,956.00			1,513.97			9,469.97	
Carsons Sinks allotments		14,436.55		14,436.55	195,461.05	101,764.17					297,225.22	
Coueur d'Alene					247.05						247.05	
Fort Hall	7,255.96	68,413.44	136.20	75,805.60	1,763,239.39	855,430.25	20,359.98	47,269.28	85,879.69	339,284.71	2,261,134.50	6,276.20
Fort McDermitt					6,354.00	407.87	66.98				6,828.85	
Goshute					626.96	3,336.92	31.96	140.66			4,136.50	

Greenville					132.52		1.35				133.87	
Kaibab					5,347.24		3.42				5,350.66	
Lemhi					2,366.13						2,366.13	
Moapa River					11,128.04	5,741.10	207.65	30.93			17,107.72	
Pyramid Lake	626.13	3,301.04	7.07	3,934.24	130,597.71	42,426.04	1,203.74	1,477.26			175,704.75	
Ruby Valley					426.22		3.20				429.42	
Shivwits		365.66	.66	366.32	1,181.99	7,187.77	54.46	88.39			8,512.61	
Skull Valley					293.69		3.37				297.06	
Summit Lake					259.44		2.70				262.14	
Uintah		46,576.55	83.84	46,660.39	916,170.70	1,070,164.19	15,153.26	20,587.30	4,089.05	316,207.87	1,701,778.53	13,949.60
Walker River	979.63	4,228.71	9.37	5,217.71	136,999.33	69,037.65	1,342.31	4,611.49			211,990.78	
Western Shoshone	120.58	5,534.70	10.18	5,665.46	47,932.08	23,708.36	352.97	1,695.99			73,689.40	
Wild Rice Lake												230.29
Total	8,982.30	142,856.65	247.32	152,086.27	3,226,719.54	2,180,448.28	38,797.82	77,415.27	89,968.74	655,492.58	4,777,919.59	20,456.09
District No. 3												
Blackfeet project	1,006.12	40,812.65	75.27	41,894.04	1,094,599.63	297,308.06	1,139.98	35,718.48	17,056.38	67,400.57	1,344,309.20	
Crow project		49,959.08	89.93	50,049.01	1,963,509.69	1,066,647.87	[1]15,515.23	29,596.07	4,789.46	306,582.05	2,763,897.35	8,085.23
Flathead project	98.89	63,768.51	114.96	63,982.36	5,169,410.51	838,624.07	8,518.66	44,596.82	80,930.88	366,400.56	5,613,818.62	
Fort Belknap project	5,318.52	13,769.15	34.36	19,122.03	348,204.94	255,884.45	3,109.05	9,602.77		3,825.14	612,976.07	
Fort Peck project		13,292.47		13,292.47	802,954.87	150,256.02	921.95	6,014.38	9,359.92	14,753.31	936,033.99	
Lake Andes drainage					463.01		3.29				466.30	
Pine Ridge project					43,977.75	3,587.24	77.81				47,642.80	
Pierre project					32,667.37	1,137.49	84.74				33,889.60	
Riverton project					366,684.50						366,684.50	
Shoshone project	12,575.69	45,573.57	104.67	58,253.93	1,451,158.17	845,822.15	13,174.18	33,895.21	14,198.89	141,843.89	2,188,006.93	931.08
Tongue River project					132,642.92	29,410.92	174.58				162,228.42	
White Earth drainage					50.32		.45				50.77	
Total	18,999.22	227,175.43	419.19	246,593.84	11,406,323.68	3,488,678.27	42,719.92	159,423.73	126,335.53	900,805.52	14,070,004.55	9,016.31
District No. 4												
Ak Chinn		4,221.88	7.60	4,229.48	30,900.00	49,123.14	759.01	673.82			81,455.97	4,260.12
Ashurst-Hayden Dam					242,157.26		1,847.57				244,004.83	
Ash Meadow					137.98		1.29				139.27	
Augustine		195.70	.35	196.05	3,237.14	2,011.76	22.82				5,271.72	
Bishop					5,685.27	30.56	45.81				5,761.64	
Cabazon		498.23	.90	499.18	13,572.84	5,028.90	50.11				18,651.85	
Cahuilla					8,176.39	659.76	57.32				8,893.47	
California allotments					1,074.74		7.72				1,082.46	852.29
Campo		8.89	.02	8.91	7,367.94	3,738.15	57.84				11,163.93	
Camp McDowell					7,383.88		10.13				7,394.01	
Camp Verde					79.15		.78				79.93	
Capitan Grande					6,318.01	478.07	13.04				6,809.12	
Carson School					12,143.59	1.34	145.41				12,290.34	13,917.22
Chiu Chiu		5,130.59	9.23	5,139.82	19,364.94	47,782.75	256.26	1,623.09			69,027.04	
Coachella Valley					1,677.27		19.03				1,696.30	
Cosmit					31.17						31.17	

[1] $14,369.41 of this amount to be included with construction cost, making total construction cost $1,977,879.10.

Indian irrigation service statement of costs, fiscal year 1928, and totals to June 30, 1928—Continued

	Costs for the fiscal year 1928				Total costs to June 30, 1928							
	Preliminary surveys and construction costs	Operation and maintenance costs	Chief engineer's charges	Total costs for year	Preliminary surveys and construction costs	Operation and maintenance costs	Chief engineer's office charges	Value inventories on hand	Less construction repayments	Less operation and maintenance repayments	Net investment of the United States	Costs not irrigation
***District No. 4*—Continued**												
Colorado River		$44,501.06	$80.10	$44,581.16	$498,437.21	$452,845.36	$8,551.11	$6,644.74	$20,196.56	$114,741.53	$831,540.33	$23,485.37
Colorado River surveys					108,053.17		815.17				108,868.34	
Colusa pumping plant					1,102.35		10.28				1,112.63	
Coolidge Dam	$1,190,328.87		[2]12,144.42	4,202,473.29	4,882,126.39		17,775.63	39,948.70			4,939,850.72	
Digger					115.79		.81				116.60	
El Tejon investigations					1,089.91		9.04				1,098.95	
Fort Apache					104,755.65	950.98	750.51				106,457.14	
Fort Bidwell					4,509.63		16.45				4,526.08	864.84
Fort Independence					7,923.94	147.61	82.15				8,153.70	
Friant					211.50						211.50	
Garden of Eden					16,020.17	2,133.16	56.51				18,209.84	
Gila Bend					2,146.28		.39				2,146.67	
Grindstone Creek					1,415.49		12.20				1,427.69	
Hat Creek					118.83		.91				119.74	
Hoopa Valley					41,868.50	2,288.27	347.84	77.00			44,581.61	
Inaja					35.93						35.93	
Independence day school												252.11
Inyo and Mono Counties	1,123.16		2.21	1,125.37	9,615.68		102.50				9,718.18	
La Jolla		133.58	.24	133.82	14,791.39	5,845.01	131.00				20,767.40	
Los Conejas					77.32		.12				77.44	
Los Coyotes					101.48		2.53				104.01	251.74
Martinez		243.29	.44	243.73	21,289.07	21,353.58	180.85	299.79			43,123.29	1,691.24
Mesa Grande					5,436.22	730.26	37.23				6,203.71	
Miscellaneous undistributed								349.20			349.20	
Mission Creek					8,580.58	482.13	108.31				9,171.02	
Mission					3,161.97						3,161.97	
Modoc County allotments					180.58		.15				180.73	
Morongo	1,625.39	2,547.78	7.51	4,180.68	104,123.69	48,612.76	863.35	1,059.81			154,659.61	
Northern California investigations					601.14		4.98				606.12	
Ownes Valley					7,855.37	91.41	39.35				7,986.13	
Ownes Valley investigations					713.16		5.34				718.50	
Pala		843.23	1.34	844.57	99,563.06	27,628.76	786.30	125.25		918.30	127,185.07	9,392.81
Palm Springs		166.83	.33	167.16	9,923.73	3,648.86	35.68				13,608.27	
Papago Surveys					20,776.38		164.57				20,940.95	
Papago Indian villages		21,189.76	38.13	21,227.89	155,238.22	177,836.36	3,083.75	7,688.82			343,847.15	2,458.00
Papago (San Xavier)	1,018.18	1,657.10	4.80	2,680.08	85,995.71	129,060.53	2,066.28	834.67			218,557.19	
Pauma	64.00	44.68	.20	108.88	6,854.91	477.93	57.83				7,390.07	

Pechango					6,189.10	360.38	1.70				6,551.18	
Perris					5,484.74						5,484.74	
Phoenix Indian School					426.58		6.01				432.59	
Pima Agency					37,945.47	3,931.90	187.54				42,064.91	1,017.79
Pima Blackwater					8,544.59	2,139.13	61.40				10,745.12	
Pima Casa Blanca					73,438.10	3,321.28	776.06				77,535.44	
Pima construction irrigation project					21,168.05		193.73				21,361.78	
Pima Fowler lease					68.29						68.29	1,216.18
Pima Gila River system	187,075.27		336.74	187,412.01	1,134,447.22		7,456.48	50,672.40			1,192,576.10	
Pima Gila River investigations					3,069.12		34.81				3,103.93	
Pima Gila River surveys					40,428.47		354.93				40,783.40	
Pima Gila River undistributed					69,353.96						69,353.96	
Pima Little Gila					19,545.77	1,325.59	326.54				21,197.90	
Pima Lower Gila project					3,595.07		23.03				3,618.10	
Pima Sacaton					451,157.92	20,991.40	969.29				473,118.61	
Pima Sacaton Bridge and Dam					707,774.77	6,647.93	5,150.72	7.50			719,580.92	
Pima Experimental Farm												239.89
Pima Sacaton Flats					779.37		10.85				790.22	
Pima Sacaton School pump												639.15
Pima M. & O. irrigation		12,175.74	21.91	12,197.65	11,948.42	91,376.18	623.42				103,948.02	
Pima Salt River power payments					100,000.00						100,000.00	
Rice School					5,522.02	2,333.75					7,855.77	
Rincon		768.91	1.38	770.29	61,114.29	23,540.26	778.42	37.00			85,469.97	213.69
Round Valley					18,097.09		114.10				18,211.19	
Salt River	338.74		.61	339.35	68,860.32	19,061.27	718.10	752.03			89,391.72	
San Carlos (Apache)		6,821.28	12.28	6,833.56	142,623.98	127,709.86	1,658.39	1,633.16			273,625.39	946.67
San Luis Rey					2,484.96	30.00	32.48				2,547.44	
San Manuel					1,498.26	30.00	.67				1,528.93	
San Pasqual					2,680.98		6.24				2,687.22	
Santa Rosa	6.90		.01	6.91	2,312.53		6.81				2,319.34	
Santa Inez					5,865.60	233.41	19.39				6,118.40	
Santa Ysabel					322.04		.15				322.19	
Sherman Institute												1,437.27
Soboba		541.57	.97	542.54	31,177.83	13,804.87	203.12				45,185.82	5,194.17
Sycuan					2,625.39	312.75	4.68				2,942.82	
Tempe drainage investigations					398.47		2.59				401.06	
Torres		370.25	.67	370.92	32,916.95	5,278.23	235.62	9.00			38,439.80	
Torres and Cabezon					14,316.57						14,316.57	
Tule River		97.54	.18	97.72	29,799.29	781.53	196.31				30,777.13	
Tuolumne					6,731.11	499.75	29.36				7,260.22	
Twenty-nine Palms					60.57						60.57	
Volcan					69.14						69.14	
Yuma	76.18	41,616.00		41,692.18	510,400.98	428,853.09	2,033.64		28,787.40	65,900.82	846,599.49	
General administration								501.85			501.85	
Total	4,381,656.69	143,773.94	12,672.57	4,538,103.20	10,219,361.35	1,735,549.96	62,209.84	112,937.83	48,983.96	181,560.65	11,899,514.3	768,438.55

[1] All of the salary of the assistant chief engineer, $4,600 for 1928, was charged to the Coolidge Dam, as this official was detailed on this particular project.

Indian irrigation service statement of costs, fiscal year 1928, and totals to June 30, 1928—Continued

	Costs for the fiscal year 1928				Total costs to June 30, 1928							
	Preliminary surveys and construction costs	Operation and maintenance costs	Chief engineer's charges	Total costs for year	Preliminary surveys and construction costs	Operation and maintenance costs	Chief engineer's office charges	Value inventories on hand	Less construction repayments	Less operation and maintenance repayments	Net investment of the United States	Costs not irrigation
District No. 5												
Chilocco School												$642.93
Havasupai Agency—Havasupai					$2,375.73		$1.58				$2,377.31	
Hopi Agency:												
Hopi					5,811.62						5,811.62	
Navajo-Hopi springs					45,959.65	$1,026.64	49.46				47,035.75	
Navajo-Hopi wells	$25,999.74	$17,284.99	$77.91	$43,362.64	391,187.56	175,953.24	10,533.41	$28,329.35			606,003.56	
Navajo-Hopi miscellaneous					586.65		5.08				573.73	
Navajo-Hopi undistributed					147,684.40						147,684.40	
Wepo Wash					2,969.48		24.48				2,993.96	
Jicarilla Agency—Jicarilla project					8,391.97		22.07				8,414.04	103.69
Leupp Agency—Leupp project					15,692.01		70.80				15,762.81	
Mescalero Agency—Mescalero project					15,696.14		2.18				15,698.32	
Northern Navajo Agency—												
Aneth	127.00		.23	127.23	1,084.32		9.90				1,094.22	
Beautiful Mountain					358.27		2.72				360.99	
Captain Tom Wash	2,168.24		3.90	2,172.14	11,778.07		108.94	408.05			12,295.06	
Dene-Hotse	260.18	15.52	.50	276.20	8,085.96	15.52	40.71				8,142.19	
Farmington Bridge												6,623.59
Hogback		8,919.40	16.05	8,935.45	243,881.55	133,631.22	2,007.33	942.20		$3,081.02	377,381.28	
Kirtland					3,465.84		26.34				3,492.18	
Pescado						441.74	3.36				445.10	
Red Rock	335.67		.60	336.27	1,999.23		13.24				2,012.47	
San Juan Springs	10,814.79	369.37	20.13	11,204.29	18,351.60	369.37	77.41				18,798.38	
Shiprock Wells					10,177.37		73.42				10,250.79	
Tes Nos Pos					1,946.17		29.08				1,975.25	188.56
Tolthlekan	3,028.20		5.45	3,033.65	6,228.28		29.80				6,258.08	
Totse Wash					4,561.96		39.32				4,601.28	
Eastern Navajo Agency—												
Mariano Lake					861.94		4.38				866.32	
Pueblo Bonito					393.91		.40				394.31	
Pueblos miscellaneous					1,563.20						1,563.20	
Southern Navajo Agency:												
Chin Lee School					1,181.49		6.21				1,187.70	
Cornfields					584.98		4.45				589.43	
Crystal	855.95		1.54	857.49	855.95		1.54				857.49	
Fort Defiance	47.13		.08	47.21	10,993.47	587.17	87.17				11,667.81	

Ganado		3,278.49	5.91	3,284.40	110,696.06	42,510.04	1,641.33	271.12			155,118.55	
Kaig ichee	87.40		.16	87.56	305.12		1.53				305.65	
Kin Lee Chee		176.24	.32	176.56	22,197.78	1,490.22	168.34	66.20			23,922.54	
Lukachukai					379.76		2.39				382.15	
Red Lake	7,293.31	125.60	13.35	7,432.26	14,130.03	125.60	57.88				14,313.51	
Sehili	230.36		.41	230.77	230.36		.41				230.77	
Tohatchi School					10,804.79		56.31				10,861.10	
Wheatfields	683.03		1.23	684.26	3,911.35		1.53				3,912.88	
Whiskey Creek	224.87		.40	225.27	224.87		.40				225.27	
Wide Ruins					1,481.90		13.04				1,494.94	
Western Navajo Agency:												
Marsh Pass					39,144.44	2,012.86	418.36				41,575.66	
Marsh Pass School					2,138.40		11.58				2,149.98	
Paiute Canyon					2,664.51		19.99				2,684.50	
Sagy Hot Socy	529.15		.95	530.10	529.15		.95				530.10	
Tuba	349.58		.63	350.21	48,278.94	2,440.70	104.62				50,824.26	
Potawatomi Agency: Kickapoo drainage	199.84		.36	200.20	421.51		.57				422.08	
Northern Pueblo Agency:												
Water surveys					3,654.63		27.96				3,682.59	
Cochita	540.52	487.91	1.85	1,030.28	40,280.63	1,113.24	204.61				41,598.48	
Nambe					4,140.88		25.25				4,166.13	
Pueblo wells		3,699.01	6.66	3,705.67	90,950.04	24,866.42	1,805.75	249.83			117,872.04	
Picuris					3,539.45		22.83				3,562.28	
San Ildefonso					32,718.75		94.61				32,813.36	256.00
San Juan drainage					6,620.97		75.07				6,696.04	
San Juan Pueblo	417.33		.75	418.08	23,018.36	377.06	141.54				23,536.96	
San Juan pumping					312.60						312.60	
San Juan River protection					38,557.87		404.27	3,180.57			42,142.71	
San Juan School					7,112.23						7,112.23	
Santa Clara	735.03		1.32	736.35	24,203.52	766.36	166.84				25,136.72	
Santo Domingo					983.54		4.49				988.03	
Taos	40.52		.07	40.59	12,062.26		63.62				12,125.88	
Tesuque	1,171.12		2.11	1,173.23	15,452.42		81.08	40.00			15,573.50	
Southern Pueblo Agency:												
Acoma					10,170.17	2,382.88	83.35				12,636.40	
Drainage Rio Grande					41,244.74	1,788.11	257.16	6,895.00			50,185.01	
Jemez	158.33		.29	158.62	10,674.33		70.68				10,745.01	80.00
Isleta		3,511.95	6.33	3,518.28	8,248.73	7,742.38	73.26	13.85			16,078.22	1,281.61
Laguna	54.35	3,941.98	7.19	4,003.52	81,400.47	11,909.91	727.95	468.25			94,506.58	783.34
San Dia					4,820.34		30.50				4,850.84	
San Felipe	3.93		.01	3.94	6,867.53		28.09				6,895.62	
Santa Ana					6,159.53		55.24				6,214.77	
Zia		518.11	.93	519.04	24,334.30	518.11	195.18	530.70			25,578.29	
Southern Ute Agency:												
Pine River project		12,234.18	22.02	12,256.20	203,907.91	104,684.78	3,025.51	2,795.44	$629.30	5,791.74	307,992.60	
Water supply investigations					6,149.57		62.07				6,211.64	
Southern Ute boundary					28.38						28.38	
Southern Ute diminished					12,447.33	1,066.50	194.71				13,708.54	
Southern Ute undistributed					73,440.21						73,440.21	
Truxton Canyon Agency					15,589.16		3.04				15,592.20	

Indian irrigation service statement of costs, fiscal year 1928, and totals to June 30, 1928—Continued

	Costs for the fiscal year 1928				Total costs to June 30, 1928							
	Preliminary surveys and construction costs	Operation and maintenance costs	Chief engineer's charges	Total costs for year	Preliminary surveys and construction costs	Operation and maintenance costs	Chief engineer's office charges	Value inventories on hand	Less construction repayments	Less operation and maintenance repayments	Net investment of the United States	Costs not irrigation
Zuni Agency:												
Zuni project	$4,104.92	$3,854.38	$14.34	$7,973.64	$588,681.05	$73,530.80	$5,273.05	$2,809.85			$670,294.75	
Zuni flood control					8,716.86		58.26				8,775.12	
Zuni well drilling					2,764.94						2,764.94	
Miscellaneous projects, district 5					7,086.96		1.81				7,088.77	$93,283.71
Headquarters								1,488.61			1,488.61	
Total	60,460.49	58,417.13	213.98	119,091.60	2,638,570.40	591,350.87	29,031.79	48,489.02	$629.30	$8,872.76	3,297,940.02	103,243.43
Summary												
District No. 1	140,670.46	123,891.45	476.21	265,038.12	5,601,900.57	1,537,743.92	40,138.61	144,451.70	855,234.29	1,252,056.15	5,216,944.36	3,399.96
District No. 2	8,982.30	142,856.65	247.32	152,086.27	3,226,719.54	2,180,448.28	38,797.82	77,415.27	89,968.74	655,492.58	4,777,919.59	20,456.09
District No. 3	18,999.22	227,175.43	419.19	246,593.84	11,406,323.68	3,488,678.27	42,719.92	159,423.73	126,335.53	900,805.52	14,070,004.55	9,016.31
District No. 4	4,381,656.69	143,773.94	12,672.57	4,538,103.20	10,219,361.35	1,735,549.96	62,209.84	112,937.83	48,983.96	181,560.65	11,899,514.37	68,438.55
District No. 5	60,460.49	58,417.13	213.98	119,091.60	2,638,570.40	591,350.87	29,031.79	48,489.02	629.30	8,872.76	3,297,940.02	103,243.43
General, including miscellaneous surveys					20,811.19						20,811.19	
Oklahoma and South Dakota					2,048.04						2,048.04	
Chief engineer's office equipment					1,402.82						1,402.82	
Grand total	4,610,769.16	696,114.60	14,029.27	5,630,913.03	33,117,137.59	9,533,771.30	212,897.98	542,717.55	1,121,151.82	2,998,787.66	39,286,584.94	204,554.43

Miscellaneous irrigation data for the fiscal year 1928

Reservation and project	Number of Indian families farming	Estimated total of irrigable land [1]	Area under constructed canals	Acreage irrigated by Indians	Acreage irrigated of Indian land leased	Acreage irrigated of white owned land	Total acreage irrigated year 1928	Acreage under constructed canals not irrigated	Estimated cost operation and maintenance, fiscal year 1929	Estimated expenditures for construction fiscal year 1929	Tentative estimates additional required to complete [2]	Estimated cost per acre when completed	Average value of land when irrigated, per acre
	1	2	3	4	5	6	7	8	9	10	11	12	13
DISTRICT NO. 1													
Lumni, drainage [3]	24	4,446								$37,000.00		$15.00	$200.00
Colville:													
Little Nespelem	6	2,000	1,600	14	147		161	1,439	$1,000.00		$2,000.00	15.00	100.00
Nespelem	14	8,000	1,500	100	150	100	350	1,150	3,000.00		250,000.00	30.00	100.00
Whitelaw or San Poil unit [4]		1,000							1,000.00			14.00	100.00
Curlew		1,572										71.00	100.00
West Okonogan		1,401	1,401		162	853	1,015	386				76.45	150.00
Miscellaneous		11,000									600,000.00	25.00	100.00
Klamath:													
Modoc Point [5]	6	6,031	6,031	800	915	150	1,865	4,166	5,300.00			32.00	75.00
Sand Creek [6]		3,614	3,614			2,636	2,636	978	2,070.00			7.00	50.00
Agency or Fort Creek	11	2,680	2,680	1,100	760	460	2,320	360	200.00			12.00	75.00
Yainax	5	30,200	1,020	500			500	520				5.25	50.00
Klamath Marsh		80,000									500,000.00	6.00	20.00
Miscellaneous		9,320											
Spokane		1,365											
Umatilla		5,000											
Yakima:													
Ahtanum	15	5,000	5,000	693	3,126	710	4,529	471	6,400.00		300,000.00	80.00	100.00
Satus [7]	5	40,000	10,665	518	3,439	1,585	5,542	5,123	7,734.00		2,650,000.00	70.00	125.00
Toppenish-Simcoe [7]	18	18,000	6,000	592	735	605	1,932	4,068	3,510.00		1,600,000.00	97.00	125.00
Wapato	131	120,000	100,000	5,345	38,720	34,415	78,480	21,520	122,500.00	212,500.00	900,000.00	50.00	150.00
Total	235	350,629	139,511	9,662	48,154	41,514	99,330	40,181	152,714.00	249,500.00	6,802,000.00		

[1] Estimated only. Many projects never actually surveyed.
[2] Best available information as to amount required to complete after June 30, 1929. Tentative approximations of cost of probable ultimate development. No surveys or investigations for determining either areas or extent and cost of work on many of the projects.
[3] Drainage project on Puget Sound.
[4] Project incomplete June 30, 1928.
[5] Only 590 acres cultivated of the irrigated area.
[6] Only 330 acres cultivated of the irrigated area.
[7] Water supply on these projects inadequate without pumping or storage.

Miscellaneous irrigation data for the fiscal year 1928—Continued

Reservation and project	Number of Indian families farming	Estimated total of irrigable land	Area under constructed canals	Acreage irrigated by Indians	Acreage irrigated of Indian land leased	Acreage irrigated of white owned land	Total acreage irrigated year 1928	Acreage under constructed canals not irrigated	Estimated cost operation and maintenance, fiscal year 1929	Estimated expenditures for construction fiscal year 1929	Tentative estimates additional required to complete	Estimated cost per acre when completed	Average value of land when irrigated, per acre
	1	2	3	4	5	6	7	8	9	10	11	12	13
DISTRICT NO. 2													
Carson sink allotments	76	4,877	4,077	1,600			1,600	2,477	$23,189.00		$50,000.00	$33.70	$100.00
Fort Hall:													
Fort Hall unit	260	60,000	50,330	9,345	4,259	14,540	28,144	22,186	59,320.00	$128,500.00	110,500.00	35.00	150.00
Mischaud unit		24,000								25,000.00	2,500,000.00	100.00	175.00
Miscellaneous	100	32,000	7,700	3,653	1,260	1,030	5,943	1,757			1,744,000.00	75.00	140.00
Fort McDermitt	56	640	600	600			600					11.00	40.00
Goshute	47	500	330	330			330				12,000.00	25.00	50.00
Indian Peak	7	30	30	30			30						50.00
Kaibab	12	400	119	44		75	119				30,000.00	252.00	80.00
Moapa River	25	625	625	355			355	270			20,000.00	50.00	125.00
Pyramid Lake [8]	62	3,130	2,200	943		12	955	1,245	4,000.00		10,000.00	50.00	150.00
Ruby Valley	10	640	160	160			160				25,000.00	14.00	50.00
Shivwits	25	83	83	57			57	26	250.00		3,000.00	45.00	40.00
Skull Valley	25	200	200	200			200					1.50	40.00
Summit Lake	13	400	400	400			400						50.00
Uintah	276	87,591	87,591	15,307	25,272	19,264	59,843	27,748	84,000.00		80,000.00	14.00	55.00
Walker River	71	10,280	3,600	1,750	14	64	1,828	1,772	5,900.00		410,000.00	51.00	150.00
Western Shoshone [9]	130	25,000	5,780	5,780			5,780		4,000.00		500,000.00	24.00	75.00
Total	1,195	250,396	163,825	40,554	30,805	34,985	106,344	57,481	180,659.00	153,500.00	5,494,500.00		
DISTRICT NO. 3													
Blackfeet [10]	9	107,500	21,337	20	500	900	1,420	19,917	37,000.00		2,266,408.00	31.30	60.00
Crow [11]	150	63,364	56,489	6,944	9,025	19,323	35,292	21,197	71,800.00		638,800.00	45.00	50.00
Flathead [12]	10	124,500	112,500	300	1,850	33,000	35,150	77,350	70,000.00	520,000.00	3,385,000.00	80.00	100.00
Fort Belknap [13]	71	25,285	16,974	7,894	1,811	212	9,917	7,057	18,300.00	2,600.00	320,700.00	26.00	50.00
Fort Peck [14]	30	47,870	22,794		631	1,220	1,851	20,943	11,500.00			40.00	50.00
Shoshone	184	78,660	57,428	8,000	3,000	8,400	19,400	38,028	43,440.00	6,800.00	1,088,000.00	32.50	50.00
Total	454	447,179	287,522	23,158	16,817	63,055	103,030	184,492	252,040.00	529,400.00	7,698,908.00		

DISTRICT NO. 4

Agua Caliente:													
Garden of Eden	5	150	150	25			25	125				107.13	$300.00
Palm Springs	1	150	150	6			6	144				66.16	300.00
Augustine	6	100	100	35			35	65				32.37	250.00
Bishop homesite	7	80	80	36			36	44				72.02	200.00
Cabazon	6	160	160	61	17		78	82				85.80	250.00
Cahuilla	8	60	60	60			60					136.27	150.00
Camp McDowell	15	2,000	102	90			90	12				36.90	100.00
Campo	5	100	51	51			51					73.70	150.00
Capitan Grande	25	200	200	135			135	65				31.60	300.00
Colorado River:													
Gravity project		104,000									7,234,600.00		
Pumping project	80	6,108	6,108	2,351	3,174		5,525	583	63,418.00			85.00	200.00
Colusa		31	31					31				36.00	100.00
Fort Apache		784	784					784				134.00	200.00
Fort Independence	10	155	155	74			74	81				51.00	150.00
Fort Yuma	150	8,325	8,325	2,700	3,195		5,895	2,430	47,166.00	6,000.00		61.56	200.00
Gila River: San Carlos		100,000	24,177	9,181		14,996	24,177		13,000.00	1,485,000.00	2,115,000.00	110.00	300.00
Hoopa Valley	50	1,758	620	500		8	508	112				72.00	150.00
Mesa Grande		60	60					60				91.50	125.00
Mission Creek	5	150	150	10			10	140				58.00	200.00
Morongo	65	775	775	488			488	287	1,500.00	2,000.00	3,000.00	140.00	500.00
Pala	30	615	615	292	43		335	280	1,052.00			163.00	300.00
Papago:													
Ak Chinn	50	300	300	242			242	58	4,160.00			105.00	150.00
Chiu Chiu	50	300	300	300			300		6,234.00			65.00	200.00
San Xavier	75	2,000	1,715	1,715			1,715			2,000.00	2,000.00	45.00	250.00
Pauma	30	207	207	102			102	105				33.00	250.00
Rincon	20	778	778	141			141	637	1,052.00			78.60	260.00
Salt River	800	3,467	3,467	3,467			3,467					25.00	200.00
Santo Yanez	5	60	60	30			30	30				75.00	150.00
San Carlos	60	2,700	1,523	313			313	1,210	7,418.00			60.00	200.00
Soboba	17	238	238	111			111	127				118.50	200.00
Torres and Martinez	100	481	481	168			168	313				36.00	250.00
Tule River	15	185	159	21			21	138				216.00	250.00
Tuolumne	13	75	50	19			19	31				140.00	200.00
Total	1,703	236,552	52,131	22,724	6,429	15,004	44,157	7,974	145,000.00	1,495,000.00	9,354,600.00		

[8] 300 acres of the irrigated land is pasture and not cultivated.
[9] 2,781 acres of the irrigated land is pasture and not cultivated.
[10] Indians farmed 211 acres, lessees 5,485 acres, white owners, 3,885 acres of project lands without irrigation in 1928.
[11] Indians irrigated 3,274 acres, lessees 1,794 acres, white owners 3,488 acres, which were not cultivated in 1928.
[12] Indians farmed 3,700 acres, lessees 10,150 acres, white owners 42,000 acres of project lands without irrigation in 1928.
[13] Indians irrigated 6,937 acres, lessees 1,144 acres which were not cultivated during 1928.
[14] Indians irrigated 555 acres, lessees 138 acres, white owners 896 acres which were not cultivated in 1928.

Miscellaneous irrigation data for the fiscal year 1928—Continued

Reservation and project	Number of Indian families farming	Estimated total of irrigable land	Area under constructed canals	Acreage irrigated by Indians	Acreage irrigated of Indian land leased	Acreage irrigated of white owned land	Total acreage irrigated year 1928	Acreage under constructed canals not irrigated	Estimated cost operation and maintenance, fiscal year 1929	Estimated expenditures for construction fiscal year 1929	Tentative estimates additional required to complete	Estimated cost per acre when completed	Average value of land when irrigated, per acre
	1	2	3	4	5	6	7	8	9	10	11	12	13
DISTRICT NO. 5													
Havasupai: Havasupai		176								$300.00			
Hopi: Wepo Wash [15]		500	500	500			500						
Jicarilla Agency: Jicarilla		627										$20.00	$100.00
Navajo, northern:													
Aneth	12	240	240	210		30	240						75.00
Captain Tom Wash	45	3,000	850	850			850					15.00	75.00
Dene Hotse	30	600	500	400			400	100				12.00	75.00
Hogback	180	4,000	4,000	1,910		350	2,260	1,740	$8,900.00			67.50	125.00
Kirkland	12	600	600	275			275	325				10.00	100.00
Red Rock	20	450	450	200			200	250				5.00	75.00
Tes Nos Pos		250	250	200			200	50				10.00	75.00
Tothlaken	15	600	600	133			133	467				12.00	75.00
Totse	10	100	100	90			90	10				46.00	75.00
Navajo, southern:													
Crystal		700	600	550			550	50		6,740.00		10.00	75.00
Ganado	33	1,740	1,740	493		143	636	1,104	3,400.00		$4,500.00	35.00	200.00
Kin Lee Chee	28	350	350	201			201	149	800.00			54.00	200.00
Red Lake		700	350					350				40.00	75.00
Toa-Ha-Li	20	505	505	189			189	316					75.00
Navajo, western:													
Marsh Pass	5	1,000	1,000	65			65	935	300.00			40.00	100.00
Paiute Canyon	25	280	280	280			280					9.00	100.00
Tuba-Moencopi-Wash	75	1,100	1,100	900			900	200	800.00			40.00	125.00
Pueblos, northern:													
Cochite	55	2,110	1,234	705		529	1,234				[16] 131,883.00	67.50	100.00
Nambe	26	1,490	1,490	190		397	587	903				40.00	125.00
Picuris	26	160	155	155			155					25.00	150.00
San Ildefonso	22	326	326	180			180	146				90.00	150.00
San Juan	115	1,067	867	650		200	850	17	2,000.00			20.00	150.00
Santa Clara	75	650	650	300			300	350	800.00			10.00	150.00
Santo Domingo	75	4,545	4,124	1,430			1,430	2,694			[16] 270,699.00	67.50	150.00
Taos	135	5,400	1,196	1,196			1,196					3.00	150.00
Tesuque	23	904	811	185			185	626				3.00	150.00

Pueblos, southern:													
Acoma	200	900	788	788			788					10.00	150.00
Isleta	209	6,532	6,173	2,400		179	2,579	3,594	500.00		[16] 475,195.00	67.50	150.00
Jamez	125	1,600	1,600	1,407		40	1,447	153	2,000.00			7.00	150.00
Laguna	400	7,900	3,020	2,700			2,700	320	2,000.00			29.00	150.00
Sandia	22	3,145	3,145	698		1,132	1,830	1,315			[16] 295,786.00	67.50	150.00
San Felipe	102	4,116	2,622	1,168		17	1,185	1,437	800.00		[16] 286,394.00	67.50	150.00
Santa Ana	45	1,226	1,226	667		142	809	417			[16] 86,052.00	67.50	150.00
Zia	35	1,050	1,050	292			292	758	1,400.00				150.00
Southern Ute: Pine River project	72	18,366	16,966	2,971	1,373	1,941	6,285	10,681	13,000.00			15.00	125.00
Zuni: Zuni	216	5,000	5,000	2,690			2,690	2,310	7,500.00		100,000.00	67.00	150.00
Total	2,488	84,005	66,458	28,218	1,373	5,100	34,691	31,767	42,200.00	7,040.00	1,650,509.00		
SUMMARY													
District No. 1	235	340,629	139,511	9,662	48,154	41,514	99,330	40,181	152,714.00	249,500.00	6,802,000.00		
District No. 2	1,195	250,396	163,825	40,554	30,805	34,985	106,344	57,481	180,659.00	153,500.00	5,494,500.00		
District No. 3	454	447,179	287,522	23,158	16,817	63,055	103,030	184,492	252,040.00	529,400.00	7,698,908.00		
District No. 4	1,703	236,552	52,131	22,724	6,429	15,004	44,157	7,974	145,000.00	1,495,000.00	9,354,600.00		
District No. 5	2,488	84,005	66,458	28,218	1,373	5,100	34,691	31,767	42,200.00	7,040.00	1,650,509.00		
Grand total	6,075	1,358,761	709,447	124,316	103,578	159,658	387,552	321,895	772,613.00	2,434,440.00	31,000,517.00		

[15] No canals constructed.
[16] These 6 pueblos are in the Middle Rio Grande Conservancy District and will cost to complete not to exceed $6,750 per acre.

Mr. GRORUD. I also have here a tabulation or statement which has been furnished the committee by the Indian Bureau.

Mr. RHOADS. I think that statement that you have been reading from is the annual statement that we make to Congress?

The CHAIRMAN. It is entitled, "Statement of reimbursable accounts between the United States and various Indian tribes for the year ended June 30, 1928, act of April 4, 1910."

Senator PINE. I think that should go in the record and be printed with these other reports.

The CHAIRMAN. Very well, without objection, this statement is also admitted and is ordered printed as part of this hearing.

Statement of Reimbursable Accounts Between the United States and Various Indian Tribes for the Fiscal Year Ended June 30, 1928

[Act April 4, 1910, 36 Stats. L. 270]

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928

Name of tribe	Amount appropriated	Expended to June 30, 1928	Amounts deposited in the U. S. Treasury as miscellaneous receipts				Reimbursable to the United States
			Carried to surplus fund	Construction charges	Sale of property	Reimbursed to the United States	
Blackfeet	$1,517,533.08	$1,480,989.72	$35,875.24	$17,277.91	$15.10	$65,013.50	$1,398,683.21
Chippewa Indians of Minnesota (Fond du Lac Band)	35,345.50	35,345.50					35,345.50
Chippewas of Lake Superior	75,000.00	31,036.17	43,963.83				31,036.17
Bad River	8,000.00	7,688.73	311.27			3,688.73	4,000.00
Red Cliff	6,500.00	6,498.46	1.54				6,498.46
Choctaws in Mississippi	91,563.25	69,713.36	21,246.89				69,713.36
Colville	115,000.00	107,112.97	7,887.03			4,713.13	102,399.84
Colorado River	833,452.73	725,502.70	107,346.74	20,223.37			705,279.33
Colorado River and Yuma	110,362.62	110,362.62					110,362.62
Yuma	705,412.01	705,177.43	234.58			5,500.00	699,677.43
Crow	352,340.00	275,025.75	76,913.95	210.36		10.00	274,805.39
Five Civilized Tribes	109,721.23	102,385.64	7,335.59			13,194.48	89,191.16
Flathead	6,072,760.00	5,473,629.86	43,431.01	102,838.22	53.00	764.75	5,369,973.89
Fort Belknap	555,231.91	524,216.44	25,284.96		260.04	14,278.57	509,677.83
Fort Hall	1,710,000.52	1,698,095.69	11,169.69	82,618.83	6,986.07	6,394.91	1,602,095.88
Fort Peck	1,050,000.00	933,726.17	113,177.85	5,250.31		1,344.14	927,130.92
Hoopa Valley	64,500.00	61,763.84	2,736.16				61,763.84
Iowas and Sac and Fox of the Missouri	10,000.00	1,000.00	9,000.00				1,000.00
Klamath	204,795.17	194,790.07	10,005.10	7,334.80			187,455.27
La Pointe	75,000.00	1,273.22	73,726.78			710.84	562.38
Mescalero	208,666.68	198,804.10	8,291.70			523.74	198,280.36
Navajo	622,882.87	510,914.41	13,541.63			33.34	510,881.07
Navajo and Hopi	383,012.96	373,193.69	9,085.25			200.00	372,993.69
Nevada (Pyramid Lake)	123,200.00	118,174.44	4,888.65				118,174.44
Newlands project (Truckee), Carson district	68,425.00	67,425.00	1,000.00				67,425.00
Omaha and Winnebago	32,136.95	20,265.84	11,861.11			9,352.77	10,913.07
Pima	8,211,960.52	7,511,118.55	64,466.86			56.50	7,511,062.05
Pottawatomie (Wisconsin and Michigan)	447,339.00	398,608.01					398,608.01
Pottawatomie and Shawnee	21,183.39	18,256.66	2,926.73			1,016.52	17,240.14
Quapaw	35,000.00	30,224.13	4,606.05				30,224.13
San Juan	50,380.00	47,000.74	3,316.12				47,000.74
San Juan and Cochiti	82,200.00	59,520.91	22,679.09				59,520.91
San Xavier	109,593.12	106,686.08	2,343.85				106,686.08
Shivwitz	15,637.97	15,006.07	631.90			200.00	14,806.07

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

Name of tribe	Amount appropriated	Expended to June 30, 1928	Amounts deposited in the U. S. Treasury as miscellaneous receipts				Reimbursable to the United States
			Carried to surplus fund	Construction charges	Sale of property	Reimbursed to the United States	
Shoshone	$2,502,522.04	$2,447,680.54	$51,025.50	$24,191.81	$2,608.14	$28,958.71	$2,391,921.88
Sioux	45,000.00	42,933.32	2,066.68			42,999.99	(1)
Southern Pueblos	93,069.05	87,476.24	4,092.76				87,476.24
Tongue River	40,000.00	40,000.00			7,340.48	21,982.44	10,677.08
Tulalip	65,000.00	47,985.67					47,985.67
Uintah	1,023,000.00	1,020,919.64	1,124.19	20,268.30	2,280.25	906,113.69	92,257.40
Umatilla	18,666.00	18,467.15	198.85			66.38	18,400.77
Warm Springs	25,160.00	24,275.27	834.18				24,275.27
Western Navajo	6,030.57	6,030.57					6,030.57
Yakima	3,495,772.92	3,338,161.12	113,944.04	1,541.21	102.80	7,255.23	3,329,261.88
Cascade Band	1,900.00	1,900.00				1,539.95	360.05
Sundry tribes	20,016.80	19,371.86	644.94			12,011.17	7,360.69
Sundry allottees	41,200.00	28,194.31	13,005.69			3,472.60	24,721.71
Tribes not specified	9,799,783.33	8,832,387.20	873,269.97	1,733.18	1,917,996.74	293,817.49	6,618,839.79
Total	41,291,247.19	37,976,315.86	1,799,493.95	283,488.30	1,937,642.62	1,445,214.38	34,310,037.23

ANALYSIS OF GENERAL STATEMENT

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
BLACKFEET TRIBE													
Irrigation systems, Blackfeet Reservation, Mont. (reimbursable).	Statement, 1927	$925,000.00	1927	$922,350.93		1927	$2,649.07	1927	$14,263.73	1926	$15.10	1927	$1.00
								1928	3,014.18			1928	12.50
									17,277.91				13.50

1914	Statement, 1914	150,000.00	1914	134,495.90		1916	15,504.10						
1916–17	Statement, 1921	25,000.00	1921	21,188.41		1921	3,811.59						
1920	Statement, 1921	50,169.61	1922	46,249.80		1922	3,919.81						
1921	Statement, 1921	25,000.00	1923	24,868.16		1923	131.84						
1922	Statement, 1922	30,000.00	1923	24,291.30		1924	5,708.70						
1923	Statement, 1923	30,000.00	1924	29,429.53		1925	570.47						
1923–24	Statement, 1924	60,000.00	1925	58,042.98		1926	1,957.02						
1925	Statement, 1925	24,020.00	1927	22,433.21		1927	1,386.19						
						1928	200.60						
							1,586.79						
Maintenance and operation, irrigation systems, Blackfeet Reservation, Mont. (reimbursable), 1926.	Mar. 3, 1925 (43 Stats. 1153).	5,000.00	1927	4,988.28		1928	11.72						
Improvement, maintenance, and operation, irrigation systems, Blackfeet Reservation, Mont. (reimbursable):													
1927	May 10, 1926 (44 Stats. 466).	15,000.00	1927	14,861.85									
			1928	7.06	$131.09								
				14,868.91									
1928	Jan. 12, 1928 (44 Stats. 945).	15,000.00	1928	14,462.97	573.03								
Surveying, etc., Blackfeet Reservation, Mont. (reimbursable).	Statement, 1914, less amount transferred by Wt. 54, May 11, 1913.	178,140.91	1914	138,343.47									
		39,797.44											
		138,343.47										1911	65,000.00
Highway from Yellowstone National Park to Glacier National Park, Blackfeet Reservation, Mont. (reimbursable), 1922.	Mar. 3, 1921 (41 Stats. 1237).	25,000.00	1923	24,975.87		1924	24.13						
CHIPPEWAS (FOND DU LAC BAND)													
Drainage assessments Indian lands in Minnesota (reimbursable).[3]	Jan. 22, 1923 (42 Stats. 1165).	9,567.62	1924	9,567.62									
Drainage assessments Indian lands in Minnesota (reimbursable) certified claims.	Mar. 3, 1926 (44 Stats. 187).	25,777.88	1927	25,777.88									
CHIPPEWAS OF LAKE SUPERIOR													
Removal and settlement of bands of Chippewa Indians of Lake Superior (reimbursable).[4]	May 29, 1872 (17 Stats. 191).	75,000.00	1910	31,036.17		1875	43,963.83						

[1] Excess reimbursed, $66.67.

[3] Act June 30, 1913 (41 Stat. 15).

[4] File 4618, 1920.

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
CHIPPEWAS OF BAD RIVER													
Diking Bad River Reservation, Wis. (reimbursable), 1915.[5]	Aug. 1, 1914 (38 Stats. 697).	$8,000.00	1915	$7,688.73		1917	$311.27					1918	$3,688.73
CHIPPEWAS OF RED CLIFF													
Completion of road Red Cliff Reservation, Wis. (reimbursable), 1917.[6]	May 18, 1916 (39 Stats. 158).	6,500.00	1917	6,498.46		1919	1.54						
CHOCTAWS IN MISSISSIPPI													
Lands and improvements for Choctaws in Mississippi:													
1921	Statement, 1924	15,000.00	1922	8,158.00		1923	6,842.00						
1922	do	5,000.00	1924	3,200.00		1924	1,800.00						
1923	do	5,300.00	1925	5,300.00									
1924	do	4,000.00	1925	2,720.00		1926	1,280.00						
1925	Statement, 1925	4,000.00	1926	2,640.00		1927	1,360.00						
1926	Statement, 1926	4,000.00	1927	3,800.00		1928	200.00						
Certified claims	Statement, 1927	2,783.25	1927	2,783.25									
Do	Feb. 28, 1927 (44 Stats. 1257).	480.00	1928	480.00									
		3,263.25		3,263.25									
Lands and improvements for Choctaws in Mississippi:													
1927	Statement, 1927	3,500.00	1927	3,447.00	$53.00								
1928	Jan. 12, 1927 (44 Stats. 941).	3,500.00	1928	2,950.00	550.00								

Industry among Choctaws in Mississippi:													
1921	Statement, 1923	10,000.00	1923	9,926.67		1923	73.33						
1922	do	10,000.00	1923	7,980.39		1924	2,019.61						
1923	do	8,000.00	1924	7,753.13		1925	246.87						
1924	Statement, 1924	8,000.00	1924	7,517.70		1926	482.30						
1925	Statement, 1925	8,000.00	1925	1,057.22		1927	6,942.78						
COLVILLE TRIBE													
Water rights, etc., for Indian allottees, Okanogan County, Wash. (reimbursable), 1917.	May 18, 1916 (39 Stats. 155).	95,000.00	1917	95,000.00								1927 1928	3,815.13 492.50
													4,307.63
Maintenance and operation charges, allotted lands, Okanogan County, Wash. (reimbursable), 1923.	May 24, 1922 (42 Stats. 579).	20,000.00	1923	12,112.97		1923	7,887.03					1927 1928	340.48 65.02
													405.50
COLORADO RIVER TRIBE													
Irrigation, Colorado River Reservation, Ariz. (reimbursable).	Statement, 1921	171,483.73	1921	171,475.38		1922	8.35	1927 1928	14,367.87 5,855.50				
									20,223.37				
1919	do	20,000.00	1921	19,300.06		1921	699.94						
1920	do	82,000.00		81,624.14		1922	375.86						
1921	do	50,000.00	1923	49,289.24		1923	710.76						
1922	Statement, 1922	50,000.00	1923	38,100.11		1924	11,899.89						
1923	Statement, 1923	30,000.00	1924	6,929.18		1925	23,070.82						
1924	Statement, 1924	30,000.00	1924	3,177.77		1926	26,822.23						
1925	Statement, 1925	20,000.00	1926	3,832.57		1927	16,167.43						
1926	Statement, 1926	10,000.00	1926	3,836.41		1928	6,163.59						
1927	Statement, 1927	5,000.00	1927	4,228.85									
			1928	307.19	463.96								
				4,536.04									
Maintenance and operation irrigation system, Colorado River Reservation, Ariz. (reimbursable):													
1920	Statement, 1922	[1] 1,000.00	1922	40,620.35		1922	379.65						
1921	Statement, 1923	36,000.00	1923	34,589.06		1923	1,410.94						
1922	do	36,000.00	1923	29,733.32		1924	6,266.68						
1923	Statement, 1924	35,000.00	1924	33,271.08		1925	1,728.92						

[1] File 53637, 1910. File 88439, 1912.

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
COLORADO RIVER TRIBE—continued													
Maintenance and operation irrigation system, Colorado River Reseruotion Ariz.—Continued.													
1924	Statement, 1925	$35,000.00	1925	$33,926.57		1926	$1,073.43						
1925	do	36,840.00	1926	34,471.57		1927	2,368.43						
1926	Statement, 1926	10,000.00	1927	9,764.12		1928	231.75						
			1928	4.13									
				9,768.25									
1927	Statement, 1927	10,000.00	1928	9,478.06	$139.33								
			1928	382.61									
				9,860.67									
Improvement, maintenance and operation, irrigation system, Colorado River Reservation, Ariz. (reimbursable), 1928.	Jan. 12, 1927 (44 Stats. 944).	10,000.00	1928	10,000.00									
Pumping plant, Colorado River Reservation, Ariz. (reimbursable):													
1920	Statement, 1922	11,000.00	1921	10,788.63		1922	211.37						
No year	Statement, 1924	129.00	1924	129.00									
Survey, etc., irrigation system, Colorado River reservation, Ariz. (reimbursable):													
1919	Statement, 1921	50,000.00	1921	43,346.39		1921	6,653.61						
1920	do	54,000.00	1922	52,896.91		1922	1,103.09						

COLORADO RIVER AND YUMA													
Irrigation allotments, Yuma and Colorado River Reservation, Ariz. (reimbursable).	Statement, 1913	70,362.62	1913	70,362.62									
1914	Statement, 1914	40,000.00	1916	40,000.00									
YUMA													
Irrigating allotments, Yuma Reservation, Calif. (reimbursable):													
1915	Statement, 1915	40,000.00	1916	40,000.00									
1916	Statement, 1916	40,000.00	1916	40,000.00									
No year	Statement, 1918	40,000.00	1919	40,000.00									
1920	Statement, 1921	131,564.94	1920	131,564.94									
1921	do	70,365.07	1921	70,365.07									
1922	Statement, 1922	88,485.00	1922	88,485.00									
Irrigation Indian lands, Yuma Reclamation project, California and Arizona (reimbursable):													
1923	May 24, 1922 (42 Stats. 567).	68,707.00	1923	68,707.00									
1924	Statement, 1924	60,000.00	1924	60,000.00									
1925	Statement, 1925	60,000.00	1925	60,000.00									
1926	Statement, 1926	31,290.00	1926	31,290.00									
1927	Statement, 1927	35,000.00	1927	35,000.00									
1928	Jan. 12, 1927 (44 Stats. 944).	10,000.00	1928	10,000.00									
Roads and bridges, Yuma Reservation, Calif. (reimbursable):													
1917–18	Statement, 1919	10,000.00	1918	9,979.48		1920	20.52					1922	$5,500.00
1919	do	10,000.00	1919	9,998.03		1921	1.97						
1922	Statement, 1922	10,000.00	1923	9,787.91		1924	212.09						
CROW													
Improvement, maintenance and operation, irrigation systems, Crow Reservation, Mont. (reimbursable):													
1923–24	Statement, 1924	175,000.00	1925	172,363.02		1926	2,636.98	1927	210.36				
1925	Statement, 1925	155,340.00	1926	81,211.98		1927	74,128.02						
Maintenance and operation, irrigation systems, Crow Reservation, Mont. (reimbursable):													
1926	Statement, 1926	16,000.00	1927	15,851.05		1928	148.95						
1927	Statement, 1927	5,000.00	1927	4,535.33									
			1928	193.33	271.34							1927	10.00
				4,728.66									
1928	Jan. 12, 1927 (44 Stats. 946).	1,000.00	1928	871.04	128.96								

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
FIVE CIVILIZED TRIBES													
Sale of inherited and other lands, Five Civilized Tribes (reimbursable).[7]	Mar. 1, 1907 (34 Stats. 1025).	$30,000.00	1910	$30,000.00								1910	$2,086.99
Payment of drainage assessments on Creek allotted lands in Oklahoma (reimbursable), 1914.	June 30, 1913 (38 Stats. 97).	20,000.00	1914	12,664.41		1916	$7,335.59					1927	2,589.35
Compromise settlement, suit of United States *v.* E. Dowden and others (reimbursable).	May 18, 1916 (39 Stats. 149).[8]	57,500.00											
	Interest paid, settlement 51766.	2,221.23	1917	59,721.23								1918	8,518.14
		59,721.23											
FLATHEAD													
Irrigation system, Flathead Reservation, Mont. (reimbursable).	Statement, 1927	4,200,000.00	1927	4,198,722.67				1927	$96,074.39	1926	$53.00	1927	369.00
			1928	864.03	$4.30	1926	409.00	1928	6,763.83			1928	395.75
				4,199,586.70					102,838.22				764.75
1922–23	Statement, 1924	200,000.00	1924	198,814.41		1925	1,185.59						
1923–24	do	555,000.00	1926	554,570.60		1926	429.40						
1925	Statement, 1925	157,760.00	1927	156,382.07		1927	1,377.93						
1926	Statement, 1926	35,000.00	1926	34,978.14		1928	5.68						
			1928	16.18									
				34,994.32									
1926–27	Statement, 1927	15,000.00	1927	4,131.50									
			1928	764.73									

	Transferred to 1927–28.			10, 193. 77									
				15, 000. 00									
1927	Statement, 1927	560, 000. 00	1927	14, 214. 25									
	Transferred to 1927–28 (warrant No. 49).			379, 985. 04									
				394, 199. 29									
	Transfer warrants Nos. 3, 35, and 108.			165, 427. 27									
				559, 626. 56									
			1928	373. 44									
				560, 000. 00									
1927–28	Transfer warrant No. 49.	379, 985. 04											
	Transfer warrants Nos. 3, 35, 72, and 108.	175, 621. 04	1928	211. 77									
		555, 606. 08			555, 394. 31								
1914	Statement, 1914	325, 000. 00	1915	284, 976. 59		1916	40, 023. 41						
Maintenance and operation, irrigation systems, Flathead Reservation, (reimbursable), 1927–28.	Jan. 12, 1927 (44 Stats. 945).	25, 000. 00	1928	24, 699. 48	300. 52								
FORT BELKNAP													
Purchase of implements, etc., for Indians on Fort Belknap Reservation, Mont. (reimbursed).	Apr. 30, 1908 (35 Stats. 83).	25, 000. 00	1915	20, 949. 39		1916	4, 050. 61		1918	260. 04	1926	14, 087. 68	
											1928	[8] 190. 91	
												14, 278. 59	
Irrigation system, Milk River, Fort Belknap Reservation, Mont. (reimbursed).	Statement, 1914	105, 081. 91	1914	105, 081. 91									
1924	do	15, 000. 00	1915	14, 991. 45		1916	8. 55						
Maintenance and operation, Milk River irrigation system, Fort Belknap Reservation, Mont. (reimbursable):													
1915	Statement, 1916	20, 000. 00	1916	19, 674. 51		1920	325. 49						
1926	Statement, 1917	20, 000. 00	1917	19, 982. 73		1918	17. 27						

[7] File 14930, 1912; 133149, 1914; 4369, 1918.

[8] Surplus funds June 30, 1928.

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
FORT BELKNAP—continued													
Maintenance and operation, irrigation system, Fort Belknap Reservation, Mont. (reimbursable):													
1917	Statement, 1917	$20,000.00	1918	$19,649.19		1919	$350.81						
1918	Statement, 1919	30,000.00	1918	29,916.21		1920	83.79						
1919	Statement, 1920	30,000.00	1920	28,174.99		1921	1,825.01						
1920	do	30,000.00	1921	29,264.69		1922	735.31						
1921	Statement, 1921	30,000.00	1922	29,123.28		1923	876.72						
1922	Statement, 1922	30,000.00	1923	26,873.22		1924	3,126.78						
1923	Statement, 1923	25,000.00	1924	24,445.64		1925	554.36						
1924	Statement, 1924	30,000.00	1925	29,436.63		1926	563.37						
1925	Statement, 1925	32,150.00	1926	30,605.31		1927	1,544.69						
1926	Statement, 1926	25,000.00	1927	23,777.80		1928	1,222.20						
1927	Statement, 1927	20,000.00	1927	19,161.30	$838.70								
1928	Jan. 12, 1927 (44 Stat. 945).	18,000.00	1928	16,906.64	1,093.36								
Enrollment, allotment, etc., Fort Belknap Reservation, Mont. (reimbursable).	Mar. 3, 1921 (41 Stat. 1357).	50,000.00	1927	36,201.55	3,798.45	1925	10,000.00						
FORT HALL													
Irrigation and water system, Fort Hall Reservation, Idaho (reimbursable).	Statement, 1913	735,000.00	1915	734,994.78		1916	5.22	1927	$75,742.18	1917	$5,920.10		
								1928	100.80				
									6,775.85				
									82,618.83				
Maintenance and operation, Fort Hall irrigation system, Idaho (reimbursable):													
1915	Statement, 1917	25,000.00	1917	23,218.24		1917	1,781.76						
1916	do	25,000.00	1917	24,886.96		1918	113.04						

1917	Statement, 1918	25,484.27	1919	25,479.49		1919	4.78			1918	15.17		
Improvements, maintenance, and operation, Fort Hall irrigation system, Idaho (reimbursable):													
1918	Statement, 1919	25,000.00	1920	24,770.64		1920	229.36						
1918–19	do	50,000.00	1920	49,265.33		1922	734.67			1919	406.02		
No year	Statement, 1924	11.00	1924	11.00									
1925	Statement, 1925	52,380.00	1927	50,136.46		1927	2,243.54						
Irrigation system, Fort Hall Reservation and ceded lands, Idaho:													
1922–23	May 24, 1922. (42 Stats. 568).	300,000.00	1927	165,043.81									
	Transfer warrant No. 4, act Mar. 3, 1925 (43 Stats. 1153).			134,956.19						1924	644.78	1927 1928	$1,500.00 4,310.34
				300,000.00									5,810.34
1924	Statement, 1927	230,045.25	1927	223,476.39								1927	11.20
	Transfer warrant No. 3.			2,547.08		1927	4,021.78					1928	64.00
				226,023.47									75.20
1925	Statement, 1927	212,080.00	1927	174,107.96								1928	509.37
	Transfer warrant No. 3.			37,452.92		1927	519.12						
				211,560.88									
1926	Statement, 1926	30,000.00											
	Transfer warrant No. 4.	134,956.19	1927	163,494.64									
	Less amount refunded.	164,956.19	1928	54.87		1928	1,516.42						
				163,439.77									
1924–1927	Transfer warrant No. 3.	2,547.08	1927	38,662.57									
		37,452.92	1928	602.29	735.14								
		40,000.00		39,264.86									

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
FORT PECK													
Irrigation system, Fort Peck Reservation, Mont. (reimbursable).	Statement, 1923	$550,000.00	1925	$520,937.73		1925	$29,062.27	1926	$2,742.11			1927	$995.20
								1927	2,508.20			1928	349.74
									5,250.31				1,344.94
1914	Statement, 1916	150,000.00	1916	121,794.52		1916	28,205.48						
1916–17	Statement, 1919	100,000.00	1919	85,343.34		1920	14,656.66						
	Less refund No. 7002, dated June 4.		1928	56.28		1928	56.28						
				85,287.06		1928	14,712.94						
1920	Statement, 1920	100,000.00	1922	98,181.92		1922	1,818.08						
1921	Statement, 1921	40,000.00	1923	28,171.46		1923	11,828.54						
Maintenance and operation irrigation system, Fort Peck Reservation, Mont. (reimbursable):													
1922	Statement, 1922	20,000.00	1923	19,033.76		1924	966.24						
1923	Statement, 1923	19,000.00	1926	14,798.01		1926	4,201.99						
1923–24	Statement, 1924	30,000.00	1924	11,752.61		1926	18,247.39						
1925	Statement, 1925	15,000.00	1927	11,926.07		1927	3,073.93						
1926	Statement, 1926	8,000.00	1927	6,939.01		1928	1,060.99						
1927	Statement, 1927	9,000.00	1927	6,404.02	$2,595.98								
1928	Jan. 12, 1927 (44 Stats. 945).	9,000.00	1928	8,500.00	500.00								
HOOPA VALLEY													
Road from Hoopa to Weitchpec, Hoopa Valley Reservation, Calif. (reimbursable):	Statement, 1921	10,000.00	1922	9,999.81		1922	.19						
1920	do	10,000.00	1920	10,000.00									

1921	do	10,500.00	1921	10,500.00									
1922	Statement, 1922	10,000.00	1922	7,998.37		1924	2,001.63						
1923	Statement, 1923	8,000.00	1923	7,365.66		1925	634.34						
1924	Statement, 1924	8,000.00	1924	7,900.00		1926	100.00						
1925	Statement, 1925	8,000.00	1926	8,000.00									
IOWAS AND SAC AND FOX OF THE MISSOURI													
Sale of lands and removal and support of Iowas and Sacs and Foxes of the Missouri (reimbursable).	Mar. 3, 1883 (23 Stats. 353).	10,000.00	1910	1,000.00		1902	9,000.00						
KLAMATH													
Irrigation system, Klamath Reservation, Oreg. (reimbursable).	Statement, 1922	155,000.00	1923	152,257.63		1925	2,742.37						
Maintenance and operation, Modoc Point irrigation system, Klamath Reservation, Oreg. (reimbursable):													
1915	Statement, 1915	4,740.00	1917	2,546.86		1917	2,193.14						
1916	Statement, 1916	4,740.00	1917	4,634.91		1924	105.09						
1918	Statement, 1920	4,310.84	1920	4,281.79		1920	29.05						
1919	do	4,000.00	1920	2,039.91		1922	1,960.09						
1920	do	5,000.00	1922	4,849.98		1922	150.02						
1921	Statement, 1922	4,004.33	1923	3,334.93		1923	669.40						
								1927	4,453.25				
Modoc Point irrigation system, Klamath Reservation, Oreg. (reimbursable):													
1917	Statement, 1921	20,000.00	1924	18,744.48		1924	1,255.52	1925	945.30				
									5,398.55				
								1928	1,936.25				
									7,334.80				
No year	do	3,000.00	1923	2,099.58		1925	900.42						
LA POINTE													
Relief of Indians of La Pointe Agency Wis. (reimbursable).	Feb. 10, 1890 (26 Stats. 669).	75,000.00	1910	1,273.22		1906	73,726.78					1928	710.84
MESCALERO													
Wagon road between Tularosa and Mescalero Agency, N. Mex. (reimbursable), 1918–19.	May 25, 1918 (40 Stats. 576).	16,000.00	1920	16,000.00									
Water supply, Mescalero Reservation, N. Mex. (reimbursable), 1923.	May 24, 1922 (42 Stats. 572).	1,000.00	1923	953.03		1925	46.97						

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
MESCALERO—continued													
Roads and bridges, Mescalero Reservation, N. Mex. (reimbursable):													
1920	Statement, 1920	$25,000.00	1921	$23,639.22		1922	$1,360.78						
1921	Statement, 1921	15,666.68	1922	14,653.02		1924	1,013.66						
1922	Statement, 1922	15,000.00	1924	15,000.00									
1923	Statement, 1923	15,000.00	1923	14,898.87		1925	101.13						
1924	Statement, 1924	15,000.00	1925	13,776.93		1926	1,223.07						
1925	Statement, 1925	12,000.00	1926	10,404.96		1927	1,595.04						
1926	Statement, 1926	10,000.00	1927	8,187.69		1928	1,371.95						
			1928	440.36									
				8,628.05									
1927	Statement, 1927	9,000.00	1927	7,429.12	$1,570.88							1927	$523.75
Support of Indians, Mescalero Reservation, N. Mex. (reimbursable), 1923–24.	Mar. 4, 1923 (42 Stats. 1539).	75,000.00	1925	73,420.90		1926	1,579.10						
NAVAJO													
Bridge across San Juan River near Bloomfield, N. Mex. (reimbursable), 1926–27.	Statement, 1927	6,620.00	1927	6,620.00									
Bridge acriss San Juan River at Shiprock, Navajo Reservation, N. Mex. (reimbursable):													
1914	Statement, 1921	20,726.14	1920	19,846.14		1916	880.00					1914	33.34
No year	do	880.00	1918	880.00									
Bridge across San Juan River at Farmington, N. Mex. (reimbursable):	Statement, 1927	25,000.00	1919	25,000.00									
1918–19	Statement, 1921	4,000.00	1921	4,000.00									

Bridge across Little Colorado River near Winslow, Ariz. (reimbursable):													
1917	Statement, 1917	15,000.00	1919	14,470.19		1919	529.81						
1919	Statement, 1919	2,000.00	1919	2,000.00									
Bridge across Little Colorado and Canon Diablo Rivers, Ariz. (reimbursable):													
1918	Mar. 2, 1917 (39 Stats. 975).	42,500.00	1918	104.13									
	Reappropriated by act of June 30, 1919.			42,395.87									
				42,500.00									
1918–19	May 25, 1918 (40 Stats. 520).	5,000.00											
	Act of June 30, 1919.			5,000.00									
1919–20	Transfer warrant No. 2.	47,395.87	1921	15,248.91									
	Transfer warrant No. 25.			32,146.96									
				47,395.87									
1920–1921	Feb. 14, 1920 (41 Stats. 417).	3,500.00											
	Transfer warrant No. 25.	32,146.96	1921	34,500.00		1923	1,146.96						
		35,646.96											
Do	Mar. 4, 1923 (42 Stats. 1539).	17,471.25	1924	17,471.25									
1921–1922	Statement, 1925	5,000.00	1922	4,470.00		1924	530.00						
Bridge across Colorado River near Lee Ferry, Ariz. (reimbursable), 1926–27.	Mar. 3, 1926 (44 Stats. 174).	100,000.00	1928	1,715.92	98,284.08								
Repairing bridge across Little Colorado River near Tanners Crossing, Ariz. (reimbursable), 1918–19.	Statement, 1920	4,000.00	1920	3,981.42		1921	18.58						
Ganado irrigation project, Navajo Reservation, Ariz. (reimbursable).	Statement, 1919	20,183.69	1924	20,171.02		1925	12.67						
1919	Statement, 1920	20,000.00	1922	19,999.29		1922	.71						
Maintenance and operation Ganado irrigation project, Navajo Reservation, Ariz. (reimbursable).	Statement, 1919	3,004.55	1919	2,795.48		1923	209.07						
1918	do	3,000.00	1919	1,904.46		1920	1,095.54						
1919	do	3,000.00	1919	2,999.58		1921	.42						
1920	Statement, 1920	3,101.96	1920	3,101.27		1922	.69						

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
NAVAJO—continued													
Maintenance and operation Granado irrigation project, Navajo Reservation, Ariz. (reimbursable)—Contd.													
1921	Statement, 1921	$3,500.00	1923	$3,455.80		1923	$44.20						
1922	Statement, 1922	3,500.00	1923	3,485.46		1924	14.54						
1923	Statement, 1923	3,000.00	1924	2,784.33		1925	215.67						
1924	Statement, 1924	3,500.00	1925	3,299.43		1926	200.57						
1925	Statement, 1925	3,800.00	1926	3,589.80		1927	210.20						
1926	Statement, 1926	2,800.00	1927	2,798.36		1928	1.64						
1927	Statement, 1927	4,000.00	1927	3,857.25	$142.75								
1928	Jan. 12, 1927 (44 Stats. 944).	2,800.00	1928	2,800.00									
Highway from Mesa Verde National Park to Gallup, N. Mex. (reimbursable:)													
1917	Statement, 1919	15,000.00	1919	15,000.00									
1918	do	15,000.00	1919	13,443.49		1920	1,556.51						
1919	Statement, 1920	25,000.00	1920	22,928.31		1921	2,071.69						
1920	do	25,664.77	1921	25,663.46		1922	1.31						
1921	Statement, 1921	11,000.00	1923	10,838.64		1923	161.36						
No year	Statement, 1924	330.51	1924	330.51									
Water supply, Navajo Indians, Arizona (reimbursable)	Statement, 1916	50,000.00	1917	49,986.62		1918	13.38						
1916–17	Statement, 1917	25,000.00	1918	24,695.29		1919	304.71						
1917–18	Statement, 1918	25,000.00	1918	20,680.40		1920	4,319.60						
Purchase of land for Navajos, New Mexico (reimbursable).	Feb. 14, 1920 (41 Stat. 423).	100,000.00	1926	99,998.20		1926	1.80						

NAVAJO AND HOPI													
Water supply, Navajo and Hopi Indians, Arizona (reimbursable):													
1918–19	Statement, 1920	25,890.17	1921	25,890.17								1925	$200.00
1920	do	33,000.00	1921	32,274.83		1922	725.17						
1921	Statement, 1921	35,222.79	1923	35,198.91		1923	23.88						
1922	Statement, 1922	35,000.00	1923	33,852.36		1924	1,147.64						
1923	Statement, 1923	35,000.00	1923	32,538.17		1925	2,461.83						
1924	Statement, 1924	45,000.00	1926	44,333.70		1926	666.30						
1925	Statement, 1925	45,900.00	1925	43,183.06		1927	2,716.94						
1926	Statement, 1926	45,000.00	1927	43,656.51		1928	1,343.49						
1927	Statement, 1927	40,000.00	1927	39,558.54									
	Less refund (No. 7849) Apr. 18.		1927	2.50									
				39,556.04	443.96								
1928	Jan. 12, 1927 (44 Stat. 943).	43,000.00	1928	42,709.94	290.06								
NEVADA, PYRAMID LAKE													
Irrigation, Pyramid Lake Reservation (reimbursable).	Statement, 1920	85,000.00	1920	83,782.66		1923	1,217.34						
Maintenance and operation, irrigation system, Pyramid Lake Reservation, Nev. (reimbursable):													
1920	do	5,000.00	1920	4,802.72		1923	197.28						
1920	do	5,400.00	1923	5,196.73		1923	203.27						
1921	do	3,000.00	1923	2,900.09		1923	99.91						
1926	do	3,500.00	1927	2,877.94		1928	622.06						
1927	do	3,500.00	1927	3,413.09	86.91								
1928	Jan. 12 1927 (44 Stats. 946).	3,500.00	1928	3,450.00	50.00								
Improvement, maintenance and operation, irrigation system, Pyramid Lake Reservation, Nev. (reimbursable):													
1922	Statement, 1922	3,000.00	1926	2,631.79		1924	368.21						
1923	Statement, 1923	2,900.00	1925	2,512.62		1925	387.38						
1924	Statement, 1924	4,200.00	1925	3,909.45		1926	290.55						
1925	Statement, 1925	4,200.00	1926	2,697.35		1927	1,502.65						
NEWLANDS PROJECT (TRUCKEE-CARSON DISTRICT)													
Reclamation and maintenance charges, Paiute allotted lands, Truckee-Carson project, Nevada (reimbursable):													
1922	Statement, 1922	8,000.00	1922	7,000.00		1924	1,000.00						
1923	Statement, 1923	7,000.00	1923	7,000.00									
1924	Statement, 1924	7,000.00	1924	7,000.00									

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
NEWLANDS PROJECT (TRUCKEE-CARSON DISTRICT)—continued													
Reclamation and maintenance charges, Paiute allotted lands, Newlands project, Nevada (reimbursable):													
1925	Statement, 1925	$6,000.00	1925	$6,000.00									
1926	Statement, 1926	6,000.00	1926	6,000.00									
Reclamation and maintenance charges, Paiute Indian lands, Newlands project, Nevada (reimbursable):													
1927	Statement, 1927	13,500.00	1927	13,500.00									
1928	Jan. 12, 1927 (44 Stats. 946).	11,325.00	1928	11,325.00									
Drainage assessments, Paiute allotted lands, Newlands project, Nevada (reimbursable):													
1925	Statement, 1925	2,100.00	1925	2,100.00									
1926	Statement, 1926	2,500.00	1926	2,500.00									
Drainage assessments, Paiute Indian lands, Newlands project, Nevada (reimbursable):													
1927	Statement, 1927	2,500.00	1927	2,500.00									
1928	Jan. 12, 1927 (44 Stats. 946).	2,500.00	1928	2,500.00									
OMAHA AND WINNEBAGO													
Drainage assessments, Omaha and Winnebago allotments, Nebraska (reimbursable):													
1916–17	May 18, 1916 (39 Stats. 142).	30,000.00	1919	18,138.89		1919	$11,861.11						

												1927	$8,346.87
												1928	1,005.90
													9,352.77
No year	Dec. 15, 1921 (42 Stats. 347).	2,126.95	1923	2,126.95									
PIMA													
Irrigation, Pima Indian lands, Arizona (reimbursable) (act of Apr. 4, 1910):	Statement, 1913	515,000.00	1914	514,427.95		1915	572.05						
Irrigation system, Pima Indian lands, Arizona (reimbursable).	Statement, 1919	25,000.00	1925	23,166.21		1926	1,833.79						
1920	Statement, 1920	7,500.00	1924	1,030.59		1922	6,469.41						
1921	Statement, 1921	5,000.00	1923	.64		1923	4,999.36						
1923	Statement, 1923	3,000.00	1923	2,033.51		1925	966.49						
1924	Statement, 1924	3,000.00	1924	2,211.86		1926	788.14						
1925	Statement, 1925	8,000.00	1925	7,479.58		1927	520.42						
1926	Statement, 1926	5,000.00	1927	704.71		1928	4,295.29						
Maintenance, irrigation system, Pima Indian lands, Arizona (reimbursable):													
1915	Statement, 1916	10,000.00	1916	8,398.67		1917	1,601.33						
1916	do	10,000.00	1917	9,327.99		1923	672.01						
Maintenance, and operation, irrigation system, Pima Indian lands, Arizona (reimbursable):	Statement, 1919	30,000.00	1923	29,271.91		1925	728.09						
1920	Statement, 1920	7,500.00	1921	7,298.89		1922	201.11						
1921	Statement, 1921	10,000.00	1922	9,948.41		1923	51.59						
1922	Statement, 1922	10,000.00	1923	7,763.84		1924	2,236.16						
1923	Statement, 1923	10,000.00	1924	8,769.81		1925	1,230.19						
1924	Statement, 1924	10,000.00	1925	8,108.22		1926	1,891.78						
1925	Statement, 1925	13,200.00	1926	13,105.58		1927	94.42						
1926	Statement, 1926	15,000.00	1927	11,342.14		1928	5,657.86					1927	31.50
1927	Statement, 1927	15,000.00	1927	11,587.45	3,412.55								
1928	Jan. 12, 1927 (44 Stats. 944).	13,000.00	1928	12,430.44	549.56								
Diversion dam, Gila River Reservation, Ariz. (reimbursable).	Statement, 1920	250,000.00	1925	241,744.93									
	Transfer warrant No. 3, July 3, 1926.			6,455.07									
				248,200.00		1926	1,800.00						
1920–21	Statement, 1921	150,000.00											
	Reappropriated (act July 1, 1922).			150,000.00									
1923	July 1, 1922 (42 Stats. 773).	150,000.00	1925	149,827.38		1925	172.62						

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
PIMA—continued													
Diversion dam, Gila River Reservation, Ariz.—Continued.													
1924–25	Statement, 1925	$306,070.00	1927	$303,703.99		1927	$2,366.01						
	May 29, 1928 (45 Stats. 934).	3,473.52	1928	40.46		1928	3,433.06					1928	$25.00
		309,543.52		303,744.45			5,799.07						
Maintenance, repairs, and operation, diversion dam, Gila River Reservation, Ariz. (reimbursable), 1927.	Transfer warrant No. 3.	6,455.07	1927	6,299.87									
	May 10, 1926 (44 Stats. 464).		1928	60.22	$94.98								
				6,360.09									
Diversion dam, Gila River, above Florence, Ariz. (reimbursable).	Statement, 1921	250,000.00	1925	241,565.27		1926	8,434.73						
Irrigation project, Gila River, above Florence, Ariz. (reimbursable).	Statement, 1919	75,000.00	1926	72,300.22		1926	2,699.78						
Irrigation project, Gila River Reservation, Ariz. (reimbursable).	Statement, 1919	50,000.00	1926	48,275.46		1926	1,724.54						
1921–22	Statement, 1922	75,000.00	1923	74,998.79		1924	1.21						
1923	Statement, 1923	50,000.00	1924	49,919.83		1925	80.17						
1924	Statement, 1924	150,000.00	1924	147,707.51		1926	2,292.49						
1925	Statement, 1925	252,160.00	1927	249,001.44		1927	1,498.56						
	Dec. 22, 1927	57.00	1928	57.00		1928	1,660.00						
	Public, No. 2	252,217.00		249,058.44			3,158.56						

1926	Statement, 1926	200,000.00	1927	192,702.44		1928	5,494.20												
			1928	1,803.36															
				194,505.80															
1927	Statement, 1927	150,000.00	1927	134,181.46															
	Less net amount credited.		1928	95.60															
				134,085.86															
	Transferred to appropriation 1927–29.			15,914.14															
				150,000.00															
1927–28	Amount transferred.	15,914.14	1928	15,861.67	52.47														
1928	Jan. 12, 1927 (44 Stats. 944).	150,000.00	1928	144,581.50	5,418.50														
Coolidge Dam across canyon of Gila River, near San Carlos, Ariz. (reimbursable), 1925–26.	Mar. 3, 1925 (43 Stats. 1152).	450,000.00	1927	229,591.08															
	Less amount refunded.			1,000.00															
				228,591.08															
	Reappropriated, act of May 10, 1926.			210,482.22															
				439,073.30															
	Amount transferred.			10,926.70															
				450,000.00															
1925–1927	Reappropriated (act of May 10, 1926).	210,482.22	1927	189,471.89															
	Transfer warrant No. 3.	9,926.70	1928	1,324.23															
	July 1, 1927	220,408.92		190,796.12															
	Transfer warrant No. 46, Dec. 10, 1927.			29,612.80															
				220,408.92															

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
PIMA—continued													
Coolidge Dam across canyon of Gila River, near San Carlos, Ariz.—Con.													
1927	Statement, 1927	$725,000.00	1927	$303,160.49									
	Less net credits, during 1928.			2,032.02									
				301,128.47									
	Amount transferred, 1927.		1928	423,868.68	$2.85								
				724,997.15									
1927-28	Transfer warrants Nos. 3, 35, 46, 108.	454,481.48	1928	413,236.88	41,244.60								
1928	Jan. 12, 1927 (44 Stats. 944).	750,000.00	1928	668,825.50	81,174.50								
1928-29	Dec. 22, 1927 (45 Stats. 18).	3,450,000.00	1928	2,945,574.90	504,425.10								
POTTAWATOMIES, WISCONSIN AND MICHIGAN													
Purchase of allotments for Wisconsin Band of Pottawatomies, Wisconsin and Michigan (reimbursable).	June 30, 1913 (38 Stats. 102).	150,000.00	1917	145,652.77									
	Transfer warrant No. 101¾ (act May 28, 1928.			4,347.23									
				150,000.00									

Support of Wisconsin Band of Pottawatomies, Wisconsin and Michigan (reimbursable):													
1917	May 18, 1916 (39 Stats. 156.)	100,000.00	1918	71,743.87									
	Transfer warrant No. 101¾ (act May 28, 1928).			28,256.11									
				100,000.00									
1918	Mar. 3, 1917 (39 Stats. 991).	100,000.00	1919	49,941.63									
	Transfer warrant No. 45.			50,058.37									
				100,000.00									
1919	May 25, 1918 (40 Stats. 589).	75,000.00	1920	67,000.00									
	Transfer warrant No. 101¾.			8,000.00									
				75,000.00									
1920	June 30, 1919 (41 Stats. 29).	15,500.00	1920	14,711.58									
	Transfer warrant No. 101¾.			788.43									
				15,500.00									
No year	Transfer warrant No. 45.	50,058.37	1925	50,058.37									
	Less refund Mar. 25, 1926, No. 7616.			500.21	500.21								
				49,558.16									
Payment to Wisconsin Band of Pottawatomies, Wisconsin and Michigan, 1928–29.	Transfer warrant No. 101¾.	41,391.78											
	May 28, 1928 (45 Stats. 901).	6,839.00											
		48,230.78			48,230.78								
POTTAWATOMIE AND SHAWNEE													
Payment of drainage assessments on allotted lands in Pottawatomie County, Okla. (reimbursable), 1915.[10]	July 1, 1914 (38 Stats. 553).	21,183.39	1915	18,256.66		1917	$2,926.73					1926	$1,016.52

[10] File 66037, 1913.

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
QUAPAW													
Sale of allotted lands, Quapaw Agency, Okla. (reimbursable)	Nov. 18, 1919 (39 Stats. 353).	$5,000.00	1921	$393.95		1924	$4,606.05						
Administration, Quapaw Agency (reimbursable):													
1927	May 10, 1926 (744 Stats. 474).	15,000.00	1927	14,832.03									
			1928	3.12	$164.85								
				14,835.15									
1928	Jan. 12, 1927 (44 Stats. 953).	15,000.00	1928	14,995.03	4.97								
SAN JUAN													
Improvement, maintenance, and operation, Hogback irrigation project, Navajo Reservation, N. Mex. (reimbursable):													
1922	Statement, 1922	8,000.00	1923	7,701.04		1924	298.96						
1923	Statement, 1923	8,000.00	1923	6,699.43		1925	1,300.57						
1924	Statement, 1924	7,500.00	1924	6,142.36		1926	1,357.64						
1925	Statement, 1925	8,680.00	1926	8,345.39		1927	334.61						
1926	Statement, 1926	5,000.00	1926	4,975.66		1928	24.34						
1927	Statement, 1927	6,000.00	1927	5,940.00	60.00								
1928	Jan. 12, 1927 (44 Stats. 946).	6,000.00	1928	5,996.86	3.14								
1928–29	May 29, 1928 (45 Stats. 900).	1,200.00	1928	1,200.00									
SAN JUAN AND COCHITI													
Bridges across Rio Grande within Cochiti and San Juan Pueblo Indian grants, N. Mex. (reimbursable), 1925.	June 5, 1924 (43 Stats. 413).	82,000.00	1926	59,520.91		1927	22,679.09						

SAN XAVIER													
Maintenance and operation of pumping plants, San Xavier Reservation, Ariz. (reimbursable):													
1920	Statement, 1922	16,847.52	1921	16,758.35		1922	89.17						
1921	do	18,500.00	1923	17,603.77		1923	896.23						
1922	do	10,000.00	1923	9,351.37		1924	648.63						
1923	Statement, 1924	9,000.00	1923	8,752.31		1925	247.69						
Certified claims	Feb. 28, 1927 (44 Stat. 1257).	5.60	1927	5.60									
1924	Statement, 1924	35,000.00	1926	34,788.89		1926	211.11						
1925	Statement, 1925	10,240.00	1927	10,202.09		1927	37.91						
1926	Statement, 1926	5,000.00	1927	4,786.89		1928	213.11						
1927	Statement, 1927	3,000.00	1927	2,779.66									
			1928	1.74	218.60								
				2,781.40									
Maintenance and operation, irrigation project, San Xavier Reservation, Ariz. (reimbursable), 1928.	Jan. 12, 1927 (44 Stat. 944).	2,000.00	1928	1,655.41	344.59								
SHIVWITZ													
Wagon road, Shivwitz Reservation, Utah (reimbursable), 1919.	Statement, 1921	5,000.00	1921	4,999.90		1921	.10					1920	$200.00
Bridge across Santa Clara River, Shivwitz Reservation, Utah (reimbursable):													
1919	do	10,000.00	1920	81.32									
	Transfer warrant No. 12.			9,918.68									
	July 19, 1919			10,000.00									
1919–20	do	9,918.68	1922	9,286.88		1922	631.80						
Certified claims	Statement, 1927	637.97	1927	637.97									
SHOSHONE													
Irrigation system, Wind River Diminished Reservation, Wyo. (reimbursable):													
Act of Apr. 4, 1910	Statement, 1920	925,000.00	1927	920,968.49		1925	4,031.51	1927	$23,180.98	1914	$2,608.14	1926	8,878.21
								1928	1,310.83				
									24,191.81				
1914	Statement, 1915	50,000.00	1915	49,371.03		1916	628.97						
1920	Statement, 1922	100,000.00	1922	99,830.35		1922	169.65						
1921	Statement, 1921	75,000.00	1923	72,435.80		1923	2,564.20						

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
SHOSHONE—continued													
Irrigation system, Wind River Diminished Reservation, Wyo.—Con.													
1922	Statement, 1922	$75,000.00	1923	$74,306.11		1924	$693.89						
1923	Statement, 1923	75,000.00	1924	73,421.12		1925	1,578.88						
1923–24	Statement, 1924	35,000.00	1925	34,690.10		1926	309.90						
1924	Statement, 1924	165,000.00	1926	157,448.26		1926	7,551.74						
1925	Statement, 1925	166,560.00	1926	164,406.83		1927	2,153.17						
Irrigation system, Wind River Diminished Reservation and ceded lands, Wyoming (reimbursable):													
1926	Statement, 1926	50,000.00	1927	48,805.73		1928	1,172.54						
			1928	21.73									
				48,827.46									
1927	Statement, 1927	55,000.00	1927	53,784.28								1927	$24.00
			1928	257.46	$958.26							1928	6.50
				54,041.74									30.50
1928	Jan. 12, 1927 (44 Stats. 947).	40,000.00	1928	37,213.46	2,786.54								
Irrigation project and ceded lands, Wind River Reservation, Wyo. (reimbursable).	Statement, 1924	100,208.94	1924	100,208.94									
1920	Statement, 1922	200,643.32	1922	200,643.32									
1921	Statement, 1921	50,427.36	1923	50,265.36		1923	161.70						
Plans, etc., for completing irrigation of Shoshone or Wind River Reservation, Wyo. (reimbursable).	Statement, 1920	5,546.99	1920	5,546.99									

Diversion dam, canals, and laterals, ceded portion of Wind River Reservation, Wyo. (reimbursable):													
1920	do	50,000.00	1920	49,540.89		1922	549.11						
No year	Statement, 1924	20.00	1924	20.00									
Canals and laterals, ceded portion of Wind River Reservation, Wyo. (reimbursable):													
1921	Statement, 1921	22,000.00	1923	21,855.70		1923	144.30						
1923	Statement, 1923	25,000.00	1924	22,618.47		1925	2,381.53						
1924	Statement, 1924	36,500.00	1925	26,374.09		1926	10,125.91						
No year	do	24.00	1924	24.00									
1925	Statement, 1925	36,500.00	1925	32,169.23		1925	4,330.77						
Payment to Indians of Wind River Reservation, Wyo. (reimbursable).[11]	Apr. 2, 1924 (43 Stats. 42).	50.00	1924	50.00								1928	50.00
Roads and bridges, Shoshone Reservation, Wyo. (reimbursable):													
1918	Statement, 1918	25,000.00	1918	24,986.18		1920	13.82					1927	20,000.00
1919	Statement, 1919	25,000.00	1920	19,628.09		1921	5,371.91						
1920	Statement, 1920	25,000.00	1921	23,753.99		1922	1,246.01						
1921	Statement, 1927	15,002.34	1927	14,994.31		1923	8.03						
Certified claims	do	39.09	1927	39.09									
1922	Statement, 1924	15,000.00	1924	11,163.03		1924	3,836.97						
1923	do	15,000.00	1926	14,994.69		1926	5.31						
1924	Statement, 1926	20,000.00	1926	19,739.36		1926	260.64						
1925	do	10,000.00	1926	8,771.14		1927	1,228.86						
1926	do	8,000.00	1927	7,493.82		1928	506.18						
1927	Statement, 1927	6,000.00	1927	5,921.80									
			1928	7.00									
				5,928.80	71.20								
Payment to Santee Sioux, Flandreau, S. Dak. (reimbursable).	Aug. 19, 1890 (26 Stats. 384).	45,000.00	1923	42,933.32		1925	2,066.68					1921	42,999.99
SOUTHERN PUEBLOS													
Irrigation system, Laguna Pueblo, N. Mex. (reimbursable):													
1921	Statement, 1923	11,069.05	1923	11,044.28		1923	24.77						
1922	do	8,000.00	1923	7,985.56		1924	14.44						
1923	do	6,000.00	1923	5,763.11		1925	236.89						
1924	Statement, 1924	6,000.00	1924	5,597.78		1926	402.22						
1925	Statement, 1925	6,000.00	1925	5,217.32		1927	782.68						
1926	Statement, 1926	4,000.00	1926	3,111.59		1928	888.41						

[11] Settlement No. 6903, Jan. 17, 1928.

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
SOUTHERN PUEBLOS—continued													
Improvement, maintenance, and operation, irrigation system, Laguna Pueblo, N. Mex. (reimbursable):													
1927	Statement, 1927	$4,000.00	1927	$2,351.89	$1,459.11								
			1928	189.00									
				2,540.89									
1928	Jan. 12, 1927 (44 Stats. 946).	3,000.00	1928	2,959.06	40.94								
Drainage, Pueblo Indian lands in Rio Grande Valley, N. Mex. (reimbursable), 1924.	Statement, 1924	20,000.00	1925	19,964.16		1926	$35.84						
Drainage, Isleta Pueblo Indian lands, Rio Grande Valley, N. Mex. (reimable), 1925.	Statement, 1926	25,000.00	1926	23,292.49		1927	1,707.51						
TONGUE RIVER													
Purchase of implements, etc., for Indians on Tongue River Reservation, Mont. (reimbursable).	Apr. 4, 1910 (36 Stats. 277).	15,000.00	1912	15,000.00						1920	$7,340.48	1925	$3,721.90
Purchase of stock for Northern Cheyenne Indians, Montana (reimbursable).	Aug. 1, 1914 (38 Stats. 294).	25,000.00	1917	25,000.00								1922	18,260.54
TULALIP													
Reclaiming lands, Lummi Reservation, Wash. (reimbursable), 1927.	July 3, 1926 (44 Stats. 856).	65,000.00	1927	25,946.30									
			1928	2,039.37									
				27,985.67									

	Transferred to 1927–1929.			37,014.33									
				65,000.00									
1927–1929	Transfer warrant No. 103.	37,014.33	1928	20,000.00	17,014.33								
UINTAH													
Irrigation system, Uintah Reservation, Utah (reimbursable).	Statement, 1918	925,000.00	1925	924,695.32	103.97	1925	304.68	1917	16,283.22	1917	2,280.25	1926	906,113.69
	Less refund No. 445, dated Aug. 17, 1928.			103.97									
				924,591.35									
1925	Statement, 1925	50,000.00	1927	49,348.28		1927	651.72	1927	1,256.60				
								1928	2,728.48				
									3,985.08				
1926	Statement, 1926	16,000.00	927	15,832.21		1928	167.79						
1927	Statement, 1927	16,000.00	1927	15,556.08									
			1928	120.11	323.81								
				15,676.19									
1928	Jan. 12, 1927 (44 Stat. 946).	16,000.00	1928	15,471.61	528.39								
UMATILLA													
Bridges, Umatilla Reservation, Oreg. (reimbursable), 1927.	May 18, 1916 (39 Stats. 150).	18,666.00	1919	18,467.15		1919	198.85					1918	66.38
WARM SPRINGS													
Support of Indians of Warm Springs Agency, Oreg. (reimbursable):													
1922	Statement, 1923	4,000.00	1923	3,776.86		1924	234.14						
1923	do	3,800.00	1924	3,747.15		1925	52.85						
1924	Statement, 1924	3,800.00	1924	3,667.20		1926	132.80						
1925	Statement, 1925	4,560.00	1925	4,371.24		1927	188.76						
1926	Statement, 1926	4,500.00	1926	4,263.37		1928	236.63						
1927	Statement, 1927	4,500.00	1927	4,455.00									
	Less refund during		1928	5.55	450.55								
				4,449.45									

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
WESTERN NAVAJO													
Bridge, Western Navajo Reservation, Ariz. (reimbursable).	Statement, 1925	$6,030.57	1917	$6,030.57									
YAKIMA													
Sale of Yakima Reservation, Wash. (reimbursable).	Statement, 1913	60,913.54	1912	60,913.54									
Irrigation, Yakima Reservation, Wash. (reimbursable).	do	105,006.49	1916	104,090.89		1923	$915.60						
1914	Statement, 1914	15,132.00	1917	14,783.13		1916	348.87						
Maintenance and operation, irrigation system, Yakima Reservation, Wash. (reimbursable).													
1915	Statement, 1917	15,107.61	1917	15,107.61									
1916	do	15,473.29	1917	15,079.26		1918	394.03						
1917	do	15,000.00	1918	14,543.15		1919	456.85						
1918	Statement, 1918	15,000.00	1920	14,772.00		1920	228.00						
1919	Statement, 1920	15,136.91	1920	15,136.91									
1920	do	15,139.81	1920	14,532.02		1922	607.79						
No year	Statement, 1924	147.80	1924	147.80									
Drainage, Yakima Reservation, Wash. (reimbursable).	Statement, 1927	250,000.00	1915	249,878.95		1918	121.05			1916	$102.80		
Town sites and allotments, Yakima Reservation, Wash. (reimbursable).	Statement, 1913	30,191.67	1913	30,178.67		1913	13.00						
Diversion dam and distribution and drainage system, Yakima Reservation, Wash. (reimbursable).	Statement, 1925	900,861.98	1925	900,861.98									
Less net amount credited			1928	428.60	$428.60			1920	$250.16			1927	$830.00
				900,433.38									

1920	Statement, 1920	500,000.00	1922	480,626.80		1923	19,373.20					1927	40.28
												1928	5,305.00
													5,345.28
1921	Statement, 1921	250,000.00	1923	245,113.90		1923	4,886.10					1926	39.26
1921–22	Statement, 1923	50,000.74	1923	49,985.88		1924	14.86					1926	28.60
1922	do	200,000.00	1923	178,240.97		1924	21,759.03						
1923	do	250,000.00	1924	233,535.48		1925	16,464.52					1926	109.85
1924	Statement, 1924	190,000.00	1925	179,024.58		1926	10,975.42					1926	490.91
No year	Statement, 1925	12.79	1925	12.79									
Certified claims	Statement, 1927	7.30	1927	7.30									
1925	Statement, 1925	11,600.00	1927	9,649.50		1927	1,950.50						
1926	Statement, 1926	10,000.00	1927	8,792.46									
			1928	134.13		1928	1,073.41						
				8,926.59									
Toppenish and Simcoe Creeks irrigation project, Yakima Reservation, Wash. (reimbursable):													
1920	Statutes 1921	80,155.71	1923	77,646.02		1923	2,509.69						
	Less credit during		1928	348.82		1928	348.82						
				77,297.20			2,858.51						
1921	Statement	75,000.00	1923	72,298.79		1923	2,701.21						
No year	Statement, 1925	85.28	1925	85.29									
Maintenance and operation, Toppenish-Simcoe irrigation system, Yakima Reservation, Wash. (reimbursable):													
1922	Statement, 1922	5,000.00	1923	2,529.42		1924	2,470.58						
1923	Statement, 1923	4,500.00	1923	2,313.30		1925	2,186.70						
1924	Statement, 1924	5,000.00	1924	2,452.67		1926	2,547.33						
1925	Statement, 1925	5,240.00	1925	1,745.70		1927	3,494.30						
1926	Statement, 1926	3,500.00	1926	1,905.23		1928	1,594.77						
1927	Statement, 1927	2,500.00	1927	2,208.52	291.48								
1928	Jan. 12, 1927 (44 Stats. 946).	2,000.00	1928	1,925.00	75.00								
Maintenance and operation, Ahtanum irrigation system, Yakima Reservation, Wash. (reimbursable):													
1922	Statement, 1922	3,000.00	1923	2,760.52		1924	239.48	1928	1,291.05				
1923	Statement, 1923	2,800.00	1923	2,570.40		1925	229.60						
1924	Statement, 1924	2,800.00	1924	2,136.23		1926	663.77						
1925	Statement, 1925	3,280.00	1925	2,539.25		1927	740.75						
Satus irrigation project, Yakima Reservation, Wash. (reimbursable):													
1924	Statement, 1926	125,000.00	1926	119,328.57		1926	5,671.43					1926	411.33
1925	Statement	58,180.00	1927	49,582.96		1927	8,597.04						

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
YAKIMA—continued													
Maintenance and operation, Satus irrigation project, Yakima Reservation, Wash. (reimbursable):													
1926	Statement	$5,000.00	1927	$4,633.66		1926	$366.34						
1927	Statement, 1927	4,000.00	1927	3,851.80	$148.20								
1928	Jan. 12, 1927 (44 Stats. 946).	3,000.00	1928	2,726.04	273.96								
Maintenance and operation, Wapato irrigation and drainage system (reimbursable), 1927.	Statement, 1927	6,000.00	1927	4,400.08									
			1928	1,185.30	414.62								
				5,585.38									
Wapato irrigation and drainage system (reimbursable), 1928.	Jan. 12, 1927 (44 Stats. 946).	185,000.00	1928	142,964.10	42,035.90								
YAKIMA (CASCADE BAND)													
Award to attorney for certain minor allottees, Cascade Band, Yakima Reservation, Wash. (reimbursable).	June 6, 1912 (37 Stats. 1246); June 30, 1913 (38 Stats. 100).	1,900.00	1914	1,900.00								1925	$1,539.95
SUNDRY TRIBES													
Appraisement and sale of land in Nebraska belonging to Omaha, Pawnee, Otoe, and Missouri, Sac and Fox of the Missouri Tribes of Indians (reimbursable).	Mar. 3, 1883 (17 Stats. 517); Aug. 4, 1886 (24 Stats. 294).	20,016.80	1910	19,371.86		1883	644.94					1883	12,011.17

SUNDRY ALLOTTEES ABSENTEE													
Payment of drainage assessments on Indian land in Oklahoma (reimbursable).	July 19, 1912 (37 Stats. 194).	40,000.00	1918	26,994.31		1924	13,005.69					1927 1928	1,352.60 1,170.00 2,522.60
SHAWNEES, ETC.													
Drainage assessmenss, absentee Shawnee allottees, Okla. (reimbursable), 1927.	July 3, 1926 (44 Stats. 855).	1,200.00	1927	996.83								1927	950.00
			1928	203.17									
				1,200.00									
TRIBES NOT SPECIFIED													
Advertising sale of Indian lands (reimbursable):													
1926	Mar. 3, 1925 (43 Stats. 1148).	1,000.00	1927	997.34		1928	2.66					1927	997.34
1927	May 10, 1926 (44 Stats. 460).	500.00	1927	219.30								1927	219.30
			1928	39.05	241.65							1928	39.05
				258.35									258.35
1928	Jan. 12, 1927 (44 Stats. 940).	500.00	1928	369.59	130.41							1928	369.59
Expenses sale of timber (reimbursable):													
1927	May 10, 1926 (44 Stats. 461).	100,000.00	1927	96,852.06								1927	88,904.8
			1928	426.06								1928	8,373.32
				97,278.12	2,721.88								97,278.12
1928	Jan. 12, 1927 (44 Stats. 942).	200,000.00	1928	196,332.97	3,667.03							1928	193,833.47
Relief of F. E. Romberg (reimbursable).	June 16, 1926 (44 Stats. 1510.)	275.00	1927	375.00									
Payment to John Terhorst, Bernard Tangen, and estate of Simon Denomie (reimbursable), 1926.	Mar. 31, 1925 (43 Stats. 1586); Mar. 3, 1926 (44 Stats. 173).	9,788.00	1927	9,788.00									
Water supply for stock and increasing range on unallotted Indian lands (reimbursable):													
1922	Mar. 3, 1921 (41 Stats. 1231).	40,000.00	1925	14,050.78		1925	25,949.22						
1923	Statement, 1926	10,000.00	1923	9,655.26		1925	344.74						
1924	do	10,000.00	1924	9,146.55		1926	853.45						
1925	do	10,000.00	1926	4,527.20		1927	5,472.80						
1926	do	10,000.00	1926	6,634.18		1928	3,464.82						

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
TRIBES NOT SPECIFIED—continued													
Water supply for stock and increasing range on unallotted Indian lands—Continued.													
	Less amount credited.		1928	$99.00									
				6,535.18									
1927	Statement, 1927	$5,000.00			$5,000.00								
1928	Jan. 12, 1927 (44 Stats. 942).	5,000.00	1928	4,099.52	900.48								
Industry among Indians (reimbursable).	June 30, 1913 (38 Stats. 80).	100,000.00	1927	34,965.82		1927	$61,412.21			1927	$903.79		
	Less net amount credited 1928.			655.31		1928	4,155.90			1928	1,169.24		
				34,310.51	121.38		65,568.11				2,073.03		
Industry among Indians:													
1915	Statement, 1921	600,000.00	1921	582,558.56		1921	17,441.444			1927	582,394.59		
1915–16	do	600,000.00	1924	540,347.91		1924	59,647.81			1927	524,620.29		
	Add difference Indian Office records.			4.28						1928	5,880.18		
				540,352.19							530,500.47		
1916–17	Statement, 1921	300,074.74	1923	266,334.95						1927	158,562.74		
	Add difference Indian Office records.			94.29		1923	33,645.50			1928	1,775.14		
				266,429.24							160,337.88		

1917-18	Statement, 1923	400,045.00	1924	365,938.74		1924	34,106.26			1927	127,662.22		
	Less transfer settlement No. 7028 Jan. 26, 1926.			500.00		1928	500.00			1928	3,817.83		
				365,438.74			34,606.26				132,480.05		
1918-19	Statement, 1922	150,094.65	1924	141,279.99		1924	8,814.66			1927	94,862.90		
										1928	234.15		
											95,097.05		
1919-20	Statement, 1923	100,082.26	1923	99,259.35		1922	822.91			1927	82,896.50		
										1928	164.87		
											83,061.37		
1921	do	100,000.00	1924	91,869.28		1924	8,130.72			1927	67,229.96		
										1928	1,721.57		
											68,951.53		
1922	do	100,000.00	1924	84,742.74		1924	15,257.26			1927	37,088.55		
										1928	2,384.46		
											39,473.01		
1923	do	80,000.00	1925	60,507.23		1925	19,492.77			1927	29,236.21		
										1928	1,639.46		
											30,875.67		
1924	Statement, 1924	80,000.00	1926	74,159.15		1926	5,840.85			1927	20,105.70		
										1928	3,783.69		
											23,889.39		
1925	Statement, 1925	150,000.00				1927	15,808.85			1927	53,025.95		
	Dec. 22, 1927 (45 Stats. 46).	83.50				1928	2,970.94			1928	8,559.34		
	May 29, 1928 (45 Stats. 934).	540.00	1927	134,191.15									
	Less net amount credited.		1928	2,347.44									
		150,623.50		131,843.71			18,779.79				61,585.29		
1926	Statement, 1926	158,000.00	1927	130,149.28						1927	34,187.60		
	Less net amount credited.		1928	3,974.38	92.65	1928	31,732.45			1928	17,386.65		
				126,174.90							51,574.25		

General statement of reimbursable appropriations for the Indian Service to and including the fiscal year ended June 30, 1928—Continued

ANALYSIS OF GENERAL STATEMENT—Continued

Title of appropriations	Acts and statutes	Amount appropriated	Expended		Balances June 30, 1928	Carried to surplus fund		Deposited in Treasury as miscellaneous receipts				Reimbursed to the United States	
								Construction and maintenance charges		Sale of property			
			Year	Amount		Year	Amount	Year	Amount	Year	Amount	Year	Amount
TRIBES NOT SPECIFIED—continued													
Industry among Indians—Continued.													
1927	Statement, 1927	$175,000.00	1927	$154,348.37						1927	$10,939.18		
			1928	6,384.88	$14,266.75					1928	35,342.04		
				160,733.25							46,281.22		
Certified claims	do	58.91	1928	58.91									
	Jan. 12, 1927 (44 Stats. 942).	175,000.00	1928	161,453.52	13,546.48					1928	8,480.24		
Irrigation ditches, Indian reservations (reimbursable).	July 4, 1884 (23 Stats. 94); Aug. 1, 1914 (38 Stats. 583).	50,000.00	1915	49,729.76		1895	$270.24						
Irrigation Indian reservations in Arizona, Montana, and Nevada (reimbursable).	Mar. 3, 1891 (26 Stats,1011); Aug. 1, 1914 (38 Stats. 583).	30,000.00											
	Less transfer warrant No. 33, June 27, 1895.	178.07	1915	27,992.78		1895	1,829.15						
		29,821.93											
Irrigation Indian reservations (reimbursable):	Statement, 1924	4,416,684.34	1925	4,143,024.03		1923	273,660.31	1926	$47.21	1921	941.70	1927	$9.38
								1928	385.97			1928	10.49
									1,733.18				19.87
1920	Statement, 1922	253,750.00	1923	213,451.19		1923	40,298.81						
1921	Statement, 1921	202,085.00	1923	161,731.37		1923	40,353.63						
1922	Statement	174,500.00	1923	130,048.91		1924	44,451.09						
1923	Statement, 1923	149,500.00	1925	121,275.25		1924	28,224.75					1927	1,060.75

1924	Statement, 1924	197,450.00	1926	153,092.96		1926	44,357.04					
1925	Statement, 1925	219,850.00	1927	175,586.19								
			1928	23.75	283.33	1927	43,956.73					
				175,609.94								
1926	Statement, 1926	130,000.00	1927	103,022.86								
			1928	70.48	26,906.66							
				103,093.34								
1927	Statement, 1927	155,000.00	1927	142,798.08								
			1928	2,950.20	9,251.72							
				145,748.28								
1928	Jan. 12, 1927 (44 Stats. 943).	150,000.00	1928	133,004.26	16,995.74							
Total		41,291,247.19		37,976,315.86	1,515,437.38		1,799,493.95		283,488.30		1,937,642.62	1,445,214.38

No funds available for reimbursement to the United States, except $20 from the Fort Belknap Tribe.

The CHAIRMAN. Mr. Collier, do you wish to make a statement?
Mr. COLLIER. Yes, if you please, Mr. Chairman.

STATEMENT OF JOHN COLLIER, EXECUTIVE SECRETARY AMERICAN INDIAN DEFENSE ASSOCIATION (INC)., WASHINGTON, D. C.

Mr. COLLIER. My statement, Mr. Chairman, has to do with the question of the method of approach to this problem which Commissioner Rhoads originally brought up—the problem that has to deal with the whole reimbursable indebtedness situation.

The system of reimbursable debt goes away back to 1867, and it is inseparable from the whole record of Government finance in Indian matters over that period of time. The reimbursable debts are of totally different classes, some individual, some tribal, some are debts by individual Indians to the tribe—not to the Government; and it is evident that they can not be disposed of through any one formula, or any one enactment. I do think that there are certain emergency matters which can and should be dealt with if possible during this session of Congress, which I will speak of.

It is possible to classify the problem in such a way that a substantial unanimity can be arrived at in certain classes of debts. For example, in the year 1914 a retrospective law was passed. Prior to that time advances by the Government for irrigation and reclamation on Indian lands had been gratuitous with no expectation of repayment. The Congress in 1914 in an appropriation bill in a very casual way legislated that all of these past gratuities, away back to 1867, should be turned into reimbursable obligations. The total was in excess of $3,000,000. That matter has been very fully discussed as far back as the time of Chairman Snyder, of the House Indian Affairs Committee. Chairman Snyder denounced the act of 1914 and called for a remission of all that body of debt.

Senator PINE. That was about the time that the Kaiser was talking about "Me and God," wasn't it?

Mr. COLLIER. About. The Indian Office has got all the data. In the first place, all the expenditures fell prior to 1914. I should think that would be a matter of record. It is a question of constitutionality and of justice, a matter, first of all, for Congress to decide whether or not it was equitable and fair to pass retrospective legislation that wouldn't have been constitutional if it had been applied to white people and had turned all these gratuities into liens. Lying beyond that is the recourse that the Indians themselves might have in the courts. They might challenge the constitutionality of that 1914 law and knock the whole thing out, but that should not be required by Congress.

Now, there is a second classification which includes more than the first I have given. It is the indebtedness that has accumulated on alloted land held in trust. As everyone here knows, the general allotment act and the special allotment acts established a guaranty that the land held in trust should be discharged free from any incumbrance. That was a guaranty written in the general allotment act of 1887 and all its derivative acts. Not only that, the Indians received their allotments under trust patents, and the trust patent guaranteed to that Indian the same immunity against having his land incumbered. It couldn't be more express or more morally

binding. Totally disregarding the guaranties of the allotment law and trust patents, the Government has piled up against these alloted lands liens exceeding $25,000,000. Three questions here arise. The first one is the constitutionality of the lien, which has never been completely tested—the possibility of annulling the entire lien through action of the courts. That subject has been investigated and quite exhaustively treated by Chauncey S. Goodrich, of San Francisco, a lawyer of eminence known to some of you gentlemen. I have here his brief which summarizes all of the court decisions existing on he subject. It is a document of about 20 pages.

Senator WHEELER. That is in reference to the question as to whether Congress had the power to place a lien upon the property of the Indians who had trust patents, where the trust patent recited that it would be issued to them free and clear of any incumbrances?

Mr. COLLIER. Yes; and it recites various cases, some indicating a greater strength and some a lesser strength in the Indian position.

Senator WHEELER. It seems to me that it ought to be perfectly clear to anybody that where the Congress of the United States—where the Government—issued to them a trust patent, that that should be given free and clear of any incumbrance; at least, there was a moral duty on the part of the United States to keep that promise. I never could understand how, if it had been brought to the attention of Congress, we could in good conscience have permitted a thing of that kind to be done. I think myself there was no legal right to do it, but, whether there was a legal right or not, certainly there was a moral obligation to carry out, and that obligation expressed in the patent to the Indian ought to be fulfilled.

Representative FREAR. How would that be challenged? The Indians have no funds.

Senator WHEELER. It could be challenged, of course, by a proceeding in court by the individual Indian, and if his case could not be made out we could repeal these provisions. As a matter of fact, we would be in duty bound to do so.

Mr. COLLIER. The situation is this, that actually, day by day, allotted Indians have died and the allotment has been put up for sale, and the lien is paid from the sale price. The tabulation submitted by the bureau shows that over $1,000,000 has already thus been taken from the Indians, and it is going to roll up faster and faster, and it amounts to a collection of substantially all the value of the land in many cases.

I bring this up here for two reasons. There are parts of this reimbursable problem that are complicated and that will require research and on which there might be differences of opinion. The two points that I attempted to bring out that related to the retrospective law of 1914, and the imposition of debt on allotted land seems to be a matter on which all parties agree. In addition they are an emergency because the collections are being currently made out of the sale of the lands of dead allottees. If this part of the reimbursable debts could be taken care of through legislation at once, then the balance of the problem and the whole subject of getting a new scientific reimbursable policy could be handled at leisure. That is the point I want to make.

May I offer for the record the brief of Chauncey S. Goodrich dealing with the lien on the allotted land, or is it desirable that it be inserted in the record?

Senator WHEELER. Yes.

The CHAIRMAN. Yes.

Mr. COLLIER. It is not long. If I may take the time of the committee for a minute more. The point I want to make, I said that the reimbursable system goes back to 1867 and is involved with the whole financial policy and procedure of the Government in Indian matters. It would be unfortunate and impracticable to abolish the reimbursable loan system. If all reimbursable debts were wiped out indiscriminately the effect would be to abolish the reimbursable loan system. It would mean that there would be no more reimbursable loans made and all advances thereafter would be in the form of gratuities. Now, there are numerous capital investments still necessary on Indian lands desired by the Indians and indicated by good public policy where the application of the reimbursable system is justifiable, and any action that would outlaw that would be manifestly undesirable for the Indians as well as for the Government. That circumstance makes it necessary to deal with the balance of the reimbursable debts that I am now going to mention on their individual merits, case by case, and it will be found in some cases reimbursable debts should be wiped out altogether. The Lees Ferry Bridge would be a case, and the Pima Bridge would be a case. It will be found in other instances that the debt should be scaled down. For example, the San Juan Pueblo Bridge, where the Indians get perhaps 5 per cent use, or perhaps 20 per cent, but they have been charged with the whole cost of the bridge. An examination shows that they should be charged not with $40,000, but with $5,000, and an equitable assessment should be made accordingly.

Now, Mr. Chairman, may I say this: I earnestly hope that the report of the irrigation advisers that has been referred to will be inserted in the record.

The CHAIRMAN. If we can find a way of printing it without unnecessary expense it will be put in the record.

Mr. COLLIER. It was gotten up by competent and disinterested engineers. It is a mine of information, and contains a good deal upon which action could be based. It doesn't pretend to be final, but it puts you a whole year ahead if you have that report at your disposal. At the present time only two or three copies exist. It is not accessible even to officers of the Government. It is one of the most valuable basic documents with respect to Indian problems.

Senator WHEELER. What does the report consist of?

Mr. COLLIER. Three typewritten volumes.

Senator WHEELER. It is possible we might be able to get it printed as a public document, and if we can get it printed as a public document it would probably be much more valuable than just to have it as a part of the hearings.

Mr. COLLIER. There is a body of record bearing on these irrigation projects, not merely that which has been incorporated in the three volumes of the irrigation advisers, but the volume of record that is contained particularly in the printed hearings of the House Appropriations Committee over all the years since 1920. As a matter of fact, the irrigation advisers' report has to be supplemented from testimony given each year before the House Appropriations Committee by the Indian Office in order to fix the responsibility for wastage of funds in some cases, for engineering errors in other cases, and in order to determine whether this or that expenditure was accepted or indorsed by the Indians themselves.

One year ago the organization of which I am secretary prepared an analysis of five or six projects based on the appropriations hearings from 1920 forward, and on the report of the irrigation advisers, and brought together a record exclusively official, whose effect in the cases that I am going to mention is to show that the Interior Department, the Indian Office, prior to 1929 requested appropriations from Congress without giving Congress adequate information on which Congress could decide either project or appropriation items in irrigation; that not only was the information not furnished Congress, but that expressly incorrect information and inconsistent information was furnished Congress through these years by the Irrigation and Reclamation Service.

Senator WHEELER. Let me ask you this—it probably should be directed to the commissioner—but do you know whether or not they are still asking for reimbursable funds and having them made a lien on Indian property?

Mr. COLLIER. They are, and, indeed, they must, under the general policy.

Senator WHEELER. Why must they?

Mr. COLLIER. Tradition—the attitude of the House Appropriations Committee, and tradition.

Senator WHEELER. I am going to serve notice on them now that I am certainly going to fight any reimbursable funds going through the Senate where they are made a lien on Indian lands

Representative FREAR. It is based on tradition.

Senator WHEELER. Whether it is based on tradition or anything else, it isn't based on justice, and I am not going to stand for it, if I can help it.

Mr. COLLIER. I am going to offer for the record these documents, bearing on the following reclamation projects: San Carlos Apache; Fort Peck; Klamath; Crow, Montana; Fort Belknap; and Blackfeet.

There is nothing original in them. They contain exclusively a compilation of source material. It would take much time to pick it out of the printed hearings. May I indicate some of the facts? From the record it develops that at San Carlos $271,000 had been spent, taken out of the tribal funds, and it had secured irrigated acreage of 300.

Senator WHEELER. Three hundred acres?

Mr. COLLIER. Three hundred acres, at $907 per acre.

In the case of the Klamath Reservation the reports, all of the departmental reports, indicate that $254,000, net, was spent to bring under cultivation 392 acres of land at a cost of $651 per irrigated acre. The San Carlos case is a particularly egregious one. It has been customary on many reservations to finance irrigation systems out of the tribal funds. In cases where the land was allotted the allottee became indebted to the tribal fund. In cases where the land was not allotted the money was simply taken out of the tribal fund instead of being advanced by the Government. Now, the San Carlos Reservation is an unallotted reservation, and the money, amounting to $271,000 through 1928, had been taken out of the tribal fund of the San Carlos Tribe. The land is not allotted and the point I want to bring out is this: A large part of this expenditure was made in the basin of the Coolidge Reservoir, which is now flooded.

It was made after the reservoir site had been segregated and even after Congress had appropriated the money to build the dam and they kept right on appropriating while the dam was being built. Meantime the Indians were being promised locations on other lands. Now they are flooded out and the last reports of the department indicate that lieu lands have not been provided them. The last report of Mr. Clotts before the House Appropriations Committee appears in the last hearings of the House Appropriations Committee. He reports that about 300 acres can be found for these Indians who have been flooded out of the dam area. Here is a case where there are no reimbursable debts standing. It raises the question whether restitution is not due. It is typical of a number of other cases where the money has been taken currently out of the existing tribal funds and has been squandered on irrigation projects. It is a question whether the Government is not indebted to the tribe.

I desire, Mr. Chairman, in offereing these memoranda to have your record state that they were compiled in January, 1929, and I have merely brought them up to date, and to state the great and unreserved confidence that the American Indian Defense Association feels in the new officers of the Indian Bureau; but it is necessary to add that the Irrigation and Reclamation Service which was inherited by these new officers is there just the same as it was before. Reorganization has not yet been accomplished. The personnel is identical in the irrigation office. Therefore, the record is a continuing record until it has been changed.

Senator WHEELER. From your visits around on these reservations where they have had irrigation, is the Reclamation Service rendering any service to the Indians in irrigating these lands?

Mr. COLLIER. They have maintained irrigation systems.

Senator WHEELER. But has it been of any benefit to the Indians?

Mr. COLLIER. It has in some of the areas.

Senator WHEELER. Whereabouts?

Mr. COLLIER. Well, for example, in the Pueblo area, the irrigation system preceded the coming of the Government in there, but the Government has spent some money usefully in building deeper wells, and the Government has spent some money usefully on new ditches. There is no question but what the Navajo Reservation irrigation system has done good with respect to irrigation farming.

Senator WHEELER. I am glad to learn of some place where they have benefited the Indian, because I don't know of any Indian reservation in Montana where the irrigation system has been of any benefit to the Indian. I think the only thing done was to benefit the white settler out there, but it hasn't been of any benefit to the Indians, and it has amounted to confiscation of their lands in many cases.

Mr. COLLIER. Isn't that due to the impracticable allotment system and the crushing reimbursable debt?

Senator WHEELER. Exactly.

Mr. COLLIER. And to the whole nightmare of the allotment system. Part of this is the pressure on Indians to lease their lands in order that the operation and maintenance charges may be collected out of the land. The Indian knows that when he buys his children can't inherit his land, and the evil is not to be blamed only on the irrigation and reclamation service, nor even wholly on the Interior Department; it is an evil resting back on the allotment act and the general policy of imposing these debts.

Senator WHEELER. I don't think that the evil lies entirely with the Indian Bureau nor the Reclamation Service. I think the evil lies as much with Congress as it does with them.

Mr. COLLIER. Answering your question more directly, there is a great deal of the evil chargeable against the service that has gone on for a very long term of years—spending, spending, and spending on projects known to be failures, spending extravagantly on projects doomed to be abandoned at an early date, making, for example, a heavy capital investment when the capital is going to be wholly wiped out by a reservoir. The evil is chargeable, of course, to the appropriation committees, who authorized these items, as well as to the department, and I merely make that statement as a saving clause. In my own observation, and I have been on most of the reclamation projects, the most distressing element is the allotment law and the reimbursable system. But the Indian Bureau, either through engineering blunders or economic miscalculations, is somewhat to blame.

As another example of the kind of detailed study that has been made, two years ago Congress passed legislation affecting the Rio Grande Pueblos in the light of certain facts which were then believed to be true. It was then believed, and I think believed by everybody, that the white people in a big conservancy district created there were going to pay $67 an acre for every irrigated acre—white farmers. That belief was challenged by nobody, and Congress legislated for the Indians and authorized an appropriation which amounted to more than $67 an acre for every Indian acre. Now, it has subsequently developed that the whites are not going to pay $67 an acre, but pay $42 an acre. The act of Congress rests on the prior belief that the whites were going to pay $67 an acre and out of that has grown a possible inequity to the Indians. It is a matter that calls for reconsideration in the light of the facts which have been developed since Congress acted and which Congress didn't have when it acted. And there are many cases of that sort all over the country.

MEMORANDUM ON REIMBURSABLE CHARGES ON ALLOTED LAND

OCTOBER 23, 1929.

Can the United States, after issuing to Indians trust patents which in terms provide that at the end of the trust period it will convey the land to the allottee "free from all charge and encumbrance if said Indian does not die before the expiration of said trust period," lawfully charge the land with irrigation or other charges, originally gratuitous but retroactively made reimbursable? Can it do so by first shortening the trust period, under the acts of Congress giving discretion to the Secretary of the Interior to terminate it?

The question seems to have been answered but once. (U. S. *v.* Heinrich, 12 Fed. (2d) 938 (1926, D. C. Mont.).)

After allotment of Crow lands, with perpetual water right, Congress (act June 4, 1920, sec. 8, 41 Stat. 751) made the proportionate cost of the irrigation system reimbursable to the Crow tribal fund by the individual owners. The United States, on behalf of the tribe, sued to collect from such an owner. On demurrer the court held it could not recover, the owner being protected in his vested right by the fifth amendment. (Choate *v.* Trapp.)

The decision is very unsatisfactory, both in its statement of facts and its declaration of the law. It does not refer to the provision of the trust patents that conveyance shall be made "free from all charge and encumbrance." It mentions that patents issued before the act of 1920, but whether trust patents only or final patents in fee does not appear.

The ruling was appealed. By the time it reached the circuit court of appeals the act of 1920 had been superseded (act of May 26, 1926, 44 Stat. 660), and the Government conceded it could not recover under the abrogated statute. It

asked, however, that the decree below be not affirmed, since this would constitute a precedent holding the earlier act unconstitutional and void. Judge Rudkin, however, said the circuit court of appeals sat in review of final judgments, not of opinions, and ordered affirmance. (U. S. *v.* Heinrich, 16 Fed. (2d) 112 (1926, C. C. A. 9th Circ.).)

Obviously, this case is not very satisfactory authority.

Other less direct authority must be considered. The leading case, on the right of the Indian allottee during the trust patent, is Choate *v.* Trapp (1912), 224 U. S. 665, 56 L. Ed. 941.

In 1897 the Dawes Commission made an agreement (Atoka agreement) with the Choctaw and Chickasaws, owning large tribal lands, which was incorporated in acts of 1898 (Curtis Act) and 1902, under which individual allotments were to be made, to be "nontaxable while the title remains in the original allottee," acceptance of the 21-year trust patents being expressly made a relinquishment by the allottee of his interest in the surplus of the tribal land. Patents had issued by the time Oklahoma was admitted (1907) into the Union, under a constitution respecting the tax exemptions created by the United States. Congress in 1908 removed the restrictions on alienation on these allotments and provided also that such unrestricted land should be subject to taxation.

Mr. Justice Lamar gave the court's opinion, asserting that the contract made by the Indians in accepting trust patents and surrendering their rights in the surplus tribal property was beyond impairment by subsequent action of Congress, and that while Congress could remove restrictions on alienation, which imposed a limitation on its grant, it could not impair the tax-exemption, which conferred a right. The court considers the argument "that (p. 945) though the provision of nontaxability added to the value of the property, it can be withdrawn, because, if not a gratuity, it is at least subject to the general rule that tax exemptions are to be strictly construed, and are subject to repeal unless the contrary clearly appears."

It grants this in the case where a State grants an exemption as a gratuity, and the exemption is strictly construed, but then says:

"But in (p. 946) the Government's dealings with the Indians the rule is exactly the contrary. The construction, instead of being strict, is liberal; doubtful expressions, instead of being resolved in favor of a weak and defenseless people, who are wards of the Nation, and dependent wholly upon its protection and good faith. This rule of construction has been recognized, without exception, for more than a hundred years, and has been applied in tax cases."

And the decision goes on to say:

"There have (p. 946) been comparatively few cases which discuss the legislative power over private property held by the Indians. But these few all recognize that he is not excepted from the protection guaranteed by the Constitution. His private rights are secured and enforced to the same extent and in the same way as other residents or citizens of the United States. (Re Heff, 197 U. S. 504, 49 L. ed. 855, 25 Sup. Ct. Rep. 506; Cherokee Nation *v.* Hitchcock, 187 U. S. 307, 47 L. ed. 190, 23 Sup. Ct. Rep. 115; Jackson ex dem. Smith *v.* Gooddell, 20 Johns. 188; Lowry *v.* Weaver, 4 McClean. 82, Fed. Cas. No. 8, 584; Whirlwind *v.* Vonder Ahe, 67 Mo. App. 628; Taylor *v.* Drew, 21 Ark. 487.) His right of private property is not subject to impairment by legislative action, even while he is, as a member of a tribe, subject to the guardianship of the United States as to his political and personal status."

So, while Congress can remove restrictions on alienation, as it did by the act of 1904 (33 Stats. 204) and other acts, such removal being supposedly for the benefit of the allottee (Williams *v.* Johnson (1915), 239 U. S. 414, 60 L. ed. 358) and can also extend, in view of the Indian's status as a ward, the period of disability (Tiger *v.* Western Inv. Co. (1918), 221 U. S. 286, 55 L. Ed. 738; Brader *v.* James (1918), 246 U. S. 89, 62 L. Ed. 591), it can not diminish his vested estate. Of the decision in the Tiger case the court said, in Choate *v.* Trapp (p. 678), that it did not "attempt to take his land, or any right, member, or appurtenance thereunto belonging."

And further:

"But there was no intimation that the power of wardship conferred authority on Congress to lessen any of the rights of property which had been vested in the individual Indian by prior laws or contracts. Such rights are protected from repeal by the provisions of the fifth amendment."

Choate *v.* Trapp, it must be noted, emphasizes the contractual relation between the allotted Indian and the Government. It is because the Indian surrendered valuable rights, in the surplus tribal land, to accept in lieu an offer of a tax-exempt individual holding, that his rights in the latter are held vested beyond

possibility of impairment. (This suggests that the case is hardly authority for the protection of an allottee in an executive-order reservation, where the accepting allottee furnishes no such manifest consideration.)

Later cases have also made it clear that it is only upon the completion of the allotment that the allottee obtains vested rights. Prior to final selection, issue of trust patent, etc., his rights are inchoate, the land remains tribal and subject to Congress's well-established plenary jurisdiction. (Sizamore *v.* Brady, 235 U. S. 450, 59 L. Ed. 312; U. S. *v.* Rowell, 243 U. S. 464, 61 L. Ed. 848; Chase *v.* U. S. (1921) 256 U. S. 1, 65 L. Ed. 801.)

The Sizamore decision was distinguished from Choate *v.* Trapp, a later case points out, "because there (Sizamore) the allottment in question was not selected or made until after the supplemental agreement went in effect." (Woodward *v.* Graffenried (1915), 238 U. S. 315, 59 L. Ed. 327.)

Only "rights created by carrying the agreement into effect could not be divested or impaired." (235 U. S. 450.)

It is of interest to look at a couple of opinions by circuit courts of appeal, which follow Choate *v.* Trapp. The first of these (Chase *v.* U. S., 222 Fed. 593 (1915, C. C. A. 8th Circ.), although reversed by the Supreme Court on the facts there presented (Chase *v.* U. S., 245 U. S. 89, 62 L. Ed. 168), uses language which has since been quoted by the two lower Federal courts with approval. The fact that it is Circuit Judge Sanborn who writes the opinion gives its language weight, despite the reversal (p. 596):

"First. Indians as well as other residents and citizens of the United States are protected by the fifth amendment to the Constitution against deprivation of property, life or liberty without due process of law. No act of Congress or legislative fiat constitutes due process of law, whereby a vested right in or title to property may be either seriously impaired or destroyed (citing cases).

"Second. Except in political cases, and this case is not a political case, Congress has no power under the Constitution of the United States to affect rights or titles granted by a treaty, or to determine what rights were granted thereby. Nor may the character of the right or interest granted to Clarissa Chase by the treaty of 1865 be determined by the opinion of Congress that that right or interest was revocable and negligible, though it be evidenced by its declaration in the act of 1882 that after the new allotments were made under that act the certificates of right and title issued by the Commissioner of Indian Affairs, under the treaty of 1865 should be null and void. The construction of treaties and the determination of the character and extent of the rights and titles granted under them is a judicial, and not a legislative function, and by the Constitution the power is granted, and the duty, which may not be renounced, is imposed upon the courts to form and enforce their independent judgments upon these questions, although these judgments may differ from the opinions of Congress or its members (citing cases)."

In another case the United States sued to restrain Minnesota officials from collecting a tax levied on an Indian allotment. Chippewas, under the Nelson Act (January 14, 1889, 25 Stats. 642), had surrendered claims to surplus tribal land and taken allotments. During the life of the trust patent the Clapp amendment was enacted, removing the restrictions on alienation and making the land subject to taxation. It was admitted the allottee whose land was sought to be taxed had "never attempted to avail himself of any power he might have under that amendment to alienate or encumber but on the contrary is insisting upon holding it according to the provisions of a trust patent issued under the authority of the Nelson Act" (p. 855). (Morrow *v.* U. S., 243 Fed. 854 (1917, C. C. A. 8th Circ.).)

The land was held nontaxable. The court, by Circuit Judge Stone, says (p. 855):

"Appellants properly concede that there was no right of taxation while the land was held solely under such trust patent. They contend that the Clapp amendment enacted four years subsequent to the issue and during the life of this trust patent had the effect of terminating it and of vesting a complete fee title in the allottee irrespective of his consent to such a change. An answering contention of the Government is that Congress had no power to alter this 'trust patent' status without the consent of such patentee, because such trust patent, issued under the Nelson Act, conveyed a property right to this patentee which had become vested. The property right intended being the separate beneficial use of the land free from taxation and involuntary alienation for 25 years from date of trust patent, with fee title thereafter.

"(1) There is no question that the Government may, in its dealings with the Indians, create property rights which, once vested, even it can not alter. (Wil-

liams *v.* Johnson, 239 U. S. 414, 36 Sup. Ct. 150, 60 L. Ed. 358; Sizemore *v.* Brady, 235 U. S. 441, 449, 35 Sup. Ct. 135, 59 L. Ed. 308; Choate *v.* Trapp, 224 U. S. 665, 32 Sup. Ct. 565, 56 L. Ed. 941; English *v.* Richardson, 224 U. S. 680, 32 Sup. Ct. 1, 44 L. Ed. 49; Chase *v.* Meehan, 175 U. S. 1, 20 Sup. Ct. 1, 44 L. Ed. 49; Chase *v.* U. S., 222 Fed. 593, 596, 138 C. C. A. 117). Such property rights may result from agreements between the Government and the Indian. Whether the transaction takes the form of a treaty or of a statute is immaterial; the important considerations are that there should be the essentials of a binding agreement between the Government and the Indian and the resultant vesting of a property right in the Indian.

"(2) That exemption of land from taxation is a property right is established. (Choate *v.* Trapp, supra.) That this Indian had taken possession of and was enjoying this land under such an exemption at the time the Clapp amendment was passed is undisputed. Therefore, if this exemption came to him as a legal right, it had fully vested. It came as such legal right if it rested on the solid basis of a binding agreement. If there was such an agreement here, it is to be found in the terms of the Nelson Act, read in the light of attendant circumstances. These circumstances are revealed in the communication of the Interior Department recounting the negotiations between the commissioners and these Indians (Doc. 247, published in vol. 32, House Exec. Doc., 51st Cong. 1st sess.). * * *

"Thus (p. 857) the terms of this act, as well as its attendant circumstances, leave no doubt that this act required, before it should become effective, an agreement to its terms by the Indians and the cession by them of very valuable tracts of lands to which their title was unimpeached. The Indians fully performed their part of the agreement, and it was in exact performance upon its side that the Government allotted to this Indian his land and was holding it for him at the time the Clapp amendment was enacted. Such a proposal, acceptance, passage of consideration, and performance between private parties would constitute a valid contract. The character of the transaction is not changed because one of the parties to it is the Government. * * *

"* * * A (p. 858) trust patent in exact compliance with such understanding and agreement was issued this Indian, and under it he has taken and holds this land. His rights are vested and are impervious to alteration against his will except through the sovereign power of eminent domain. One of these rights was freedom from State and local taxation.

"The instant case is not one depending upon governmental wardship over a dependent and inferior people, but is based upon the legal relation of trusteeship, and springs from the obligation contained in the terms of the trust to preserve the land, so that at the end of the trust period it can be passed to the beneficiary 'free of all charge or incumbrance.'"

In the case of U. S. *v.* Benewah County (290 Fed. 628, 1923, C. C. A. 9th Circ.), trust allotments had been made in 1909 out of a treaty reservation; in 1916 Secretary Lane declared two allottees competent and issued to them patents in fee, under the act of May 8, 1906 (34 Stats. 182); "this was done upon the Secretary's own initiative, and not in response to any application on the part of the two Indians. The Indians refused to accept the patents, and the same were held for delivery until January 6, 1921, when they were revoked and canceled by the Secretary" (p. 629); the State taxed the land in question, 1918–1920.

Circuit Judge Gilbert says (p. 630):

"* * * here there was no application by the Indian for a patent in fee, and there was no acceptance of the patent when issued. On the contrary, there was a distinct refusal to receive it. In view of the foregoing, and other considerations to be hereafter discussed, we are of the opinion that title in fee did not pass to the Indians by the issuance of the patents. * * *

"There can be no serious question of the authority of Congress to remove restrictions upon the alienation of the lands of allottees with or without the latter's consent. (Williams *v.* Johnson, 239 U. S. 414, 36 Sup. Ct. 150, 60 L. Ed. 358.) But to remove restriction upon alienation is a different thing from depriving Indian allottees of the immunity from taxation conferred upon them by their trust patents. The Indians were guaranteed nontaxable land for the period of 25 years after the issuance of the trust patents. In Choate *v.* Trapp, the court gave consideration to the fact that the Indians were offered the allotments on the conditions proposed, and that by accepting the terms and relinquishing their claims they furnished a consideration which was sufficient to entitle them to enforce whatever rights were conferred. One of those rights was exemption from taxation. The court held that the provision that the land should be nontaxable was a property right, which Congress undoubtedly had the power to grant.

"So in the present case the right of the Indians to have their allotments held in trust by the United States free from taxation by local authorities for a period of 25 years was a valuable right. Once vested as it was, it could only be divested by due process of law. The provision of the act of May 8, 1906 (34 Stat. 182), authorizing the Secretary of the Interior, 'whenever he shall be satisfied that any Indian allottee is competent and capable of managing his or her affairs at any time shall cause to be issued to such allottee a patent in fee simple, and thereafter all restrictions as to sale, incumbrance, or taxation of said land shall be removed,' etc., when read in the light of the principles of law here involved, should, we think, be held to mean that such action by the Secretary can be had only upon the application of the allottee or with his consent. Prior to the date of the act last referred to, allottees had been granted citizenship and fee-simple titles only by special acts of Congress. It is noteworthy that, in other contemporaneous general provisions for granting Indian allottees patents in fee simple, it was expressly provided that such action might be had 'upon application' of the Indians, as in the act of June 21, 1906 (34 Stat. 353), and the act of April 21, 1904 (33 Stat. 204)."

To the same effect: Iyall *v.* Yakima Co., 1924 (130 Wash. 537, 228 Pac. 513).

When there is a contract, then, between the Indian allottee and the United States that the former's land shall be conveyed to him at the end of the trust period "free from all charge and encumbrance," it is beyond the power of Congress (directly or through the Secretary of the Interior), save upon the initiative or with the consent of the allottee, to change that contract and make the land subject to State taxation.

But how about a Federal "charge" or "encumbrance"? This would seem, on principle, at least as objectionable as a State tax.

Though not directly in point, the case may be mentioned where the question was considered whether the Federal income tax law reached the income derived (by a white man) from operations under a lease of trust patented Osage Indian oil lands. The lower courts would not construe the law to reach this income, which to them seemed so directly connected with the land (oil in place was land) as to be tax exempt. One circuit court of appeals, by Circuit Judge Buffington, said:

"* * * any legislation by government imposing taxation on its dependent ward must be in certain and indubitable terms. (Choate *v.* Trapp, 224 U. S. 665, 32 S. Ct. 565, 56 L. Ed. 941.)

"(4) Fourth. That, in the absence of any expressed purpose of Congress to change the uniform and unbroken policy of the Government to regard and deal with the Indian tribes as wards and dependents, the purpose and intent of Congress to change that policy, and impose a tax by Government on its wards, will not be implied, and the general terms of the income tax statute should not be construed to embrace the Indian wards of the Government. In support of this reference is made to the Quapaw Indians (34 Ops. Atty. Gen. 439), where it is said, 'In other words, it is not lightly to be assumed that Congress intended to tax the ward for the benefit of the guardian;' and Choate *v.* Trapp, supra, where it is said, 'The construction, instead of being strict, is liberal; doubtful expressions, instead of being resolved in favor of the United States, are to be resolved in favor of a weak and defenseless people, who are wards of the Nation, and dependent, wholly upon its protection and good faith.'"

Lewellyn *v.* Colonial Trust Co. (17 Fed. (2d) 36, 37, 1927, C. C. A. 3d Circ.)

See ibid, in district court. (12 Fed. (2d) 481.)

But the Supreme Court held otherwise. The income tax statute was all embracing, it said, and reached the lessee's income even though such tax (235) "may have some economic effect upon the Indians themselves." Heiner *v.* Colonial Trust Co., Lewellyn *v.* Colonial Trust Co. (275 U. S. 232, 72 L. Ed 256, 1927.)

Does the tax reach the income (oil royalties) derived by the Indian? The district court held it did not.

"The Supreme Court has very clearly announced the position to be aasumed by the United States in tax matters with Indian allottees. It is true the tax involved in the above case was different in form that the tax in the instant case, but it seems the difference is one of form only. In the instant case income taxes have been collected upon income from oil royalties; it is a tax upon the income from oil produced from the lands allotted to the plaintiff. Oil and gas, until severed, are part of the realty; if the quantity of oil under a given tract of land were capable of estimation, the value of the tract would be enhanced by the vlaue of the oil in place, and this increased value would be subject to the general taxes of the local government. Could it successfully be contended that, if the above

were possible, and Indian allottee's land having oil deposits thereunder would be subject to taxation, at least to the extent of the oil value? I think not, for the lands are exempted from taxation. Likewise a tax upon the income derived from the sale of a part of the land, the oil or minerals, should not be enforced against an allottee * * *

"That the tax was illegal is conceded by the Commissioner of Internal Revenue and is beyond all doubt, I think. In view of the attitude assumed by the government that Indians should enjoy their allotted lands free from taxation for the period fixed by the acts, it is the judgment of the court that plaintiff recover from the United States of America the taxes paid by him as alleged in his bill."

Richards *v.* U. S. (21 Fed. (2d) 94, 95, 1927.)

Unfortunately, in this case the Indian had not filed his claim for a refund within four years. The district court held that as between guardian and ward no statute of limitations ran. But the appellate court held otherwise:

"Under the act of May 27, 1908, 35 Stat. 312, all restrictions on voluntary disposal of his allotment were removed, and perforce of that act the allotment and Richards' control over it passed from governmental supervision. Richards thereafter held title 'with all the rights and incidents of full ownership by psesons of full capacity.' United States *v.* Waller. (243 U. S. 452, 37 S. Ct. 430, 61 L. Ed. 843.) Any relation of guardianship that may have previously existed, was terminated we think by this act and the two acts now to be mentioned. By section 6 of the act of February 8, 1887 (24 Stat. 388, 390), as amended by the act of March 3, 1901 (31 Stat. 1447, (8 U. S. C. A. No. 3), he was declared a citizen of the United States 'entitled to all the rights, privilgees, and immunities of such citizens, whether said Indian has been or not, by birth or otherwise, a member of any tribe of Indians within the territorial limits of the United States.' At the time the assessments and payments were made he had full charge and control of the allotment and the income therefrom. He had the right to assert in his own name, in court or elsewhere, such claims as he cared to make, and defend against those made by others. He was charged with notice that there was a special and exclusive remedy provided for the recovery of a tax that had been erroneously and illegally assessed and collected. He attempted to avail himself of that remedy without complying with precedent conditions on which it rested and after his right to do so had expired.

"(3) Counsel insists that his noncompliance with the statutory requirement should be ignored because Richards was then and is now a member of the Choctaw Tribe. The statute makes no exception based only on the racial status or relation of the taxpayer. We do not know on what principle we can do so.

"On the facts set up we think plaintiff's claim can not be granted as of legal right. The refund, if it is ever to be made, must be as a matter of grace." U. S. *v.* Richards. (27 Fed. (2d) 284, 286, 1928, C. C. A. 8th Circ.)

And a writ of certiorari was refused by the Supreme Court. Richards *v.* U. S. (278 U. S. 630, 73 L. Ed. 80, 49 Sup. Ct. Rep. 29.)

In the Heiner (Lewellyn) case the Supreme Court reserved the question whether an Indian's royalties were subject to income tax, though assuming, for the instant purpose, that they were not:

"These statutes (p. 234) in terms plainly embrace the income of a non-Indian lessee derived from the lease of restricted Indian lands. * * *

"Assuming that the Indians are not subject to the income tax, as contended, the fact that they are wards of the Government is not a persuasive reason for inferring a purpose to exempt from taxation the income of others derived from their dealing with the Indians." (275 U. S.)

The Attorney General of the United States, passing on the question whether income derived frow Quapaw trust allotments, made under a statute which was silent on the matter of taxes during the trust period, was subject to Federal income tax, ruled such income was not so subject.

"In other words, it is not lightly to be assumed that Congress intended to tax the ward for the benefit of the guardian." (34 Ops. Atty. Gen. 439, 445, March 20, 1925, Sargent.)

An earlier Attorney General had already held the Indian's income from royalties on oil recovered from tax-exempt lands exempt from Federal income tax.

"If a State can not tax them (incomes), the question arises, is it proper or legal for the Federal Government to tax them? Is it consistent for it to guard this income from the State taxing power and surrender it to congressional authority? Would such procedure be consistent with its policy toward the Indian as protector and conservator? * * * the (tax) exemption became a vested right which can not be taken away. During the period the land is exempt from taxation, the income is also immune." (34 Ops. Atty. Gen. 275, 285, March 15, 1924,

Dougherty); 35 Ops. Atty. Gen. 1 (November 11, 1925, Sargent); 35 Ops. Atty. Gen. 107, Hopi Indians, unallotted (June 24, 1926, Sargent).

Tribal funds, derived from oil royalties, are in a different class. Congress may subject these to a 1 per cent county charge for road construction and maintenance. Act of March 3, 1921. (40 Stats. 1251.) (33 Ops. Att'y Gen'l, 60, November 4, 1921, Dougherty.)

The fifth amendment to the Federal Constitution, which has been held to protect an Indian in his vested rights provides that no person "Shall * * * be deprived of life, liberty, or property without due process of law; nor shall private property be taken for public use, without just compensation."

The "process" here mentioned means that of the United States, not of the States.

Calvert, "The Constitution and the Courts" (1924) Vol. II, amendment V, and cases cited.

Another notable instance in which it has been relief on to protect the Indian, besides the instance afforded by Choate *v.* Trapp, is the case holding that where Indians, after a hearing, are entered on the tribal rolls, they acquired vested rights of which they could not be divested save upon notice and after a hearing.

"The right to be heard before property is taken or rights or privileges withdrawn which have been previously legally awarded is of the essence of due process of law." (Garfield *v.* Goldsby, 211 U. S. 249, 262, 53 L. Ed. 168, 1908; U. S. *v.* Fisher, 222 U. S. 204, 56 L. Ed. 165, 1911; U. S. *v.* Fisher, 223 U. S. 94, 56 L. Ed. 364, 1912.)

Here the act complained of was the arbitrary act of the Secretary alone, Congress not having granted him any authority. On the other hand, where Congress vests the Secretary with power and discretion to remove an Indian from a tribal cuncil without a hearing, this does not constitute a denial of due process. (Brown *v.* Lane, 232 U. S. 584, 58 L. Ed. 748.)

One element of difference between the case presented by the tax-exempt cases (Choate *v.* Trapp, etc.), and our supposed case is that in the latter the charges in question are supposed to benefit the land, presumably to the extent of the charges imposed, if not to a greater extent. And since, during the trust period, the allottee can not himself put encumbrances on the land for its benefit, it might well be argued that unless power remained in the Government to do so, the interests of the allottee would suffer. This may be granted; but in our supposed case it is assumed (a) the expenditures were first made as a gratuity, and (b) no consent of the allottee to the gratuity's being made reimbursable was secured. After the allotment he had a certain vested estate; it could not be altered save with his participation. The growing policy of the department and of Congress to secure the consent of tribal councils to making proposed irrigation expenditures reimbursable out of tribal funds is of interest in this connection. And when a State reclamation district includes allotted lands of the Five Civilized Tribes the Secretary of the Interior can pay, out of the allottee's funds, up to $15 an acre of such charges, if the allottee, or his guardian, consents. (Act of March 27, 1914, 38 Stats. 310.)

An opinion of the Attorney General is of interest, in which he holds that white purchases of allotted irrigable Indian land on the Wind River Reservation in Wyoming, having been bought after the department had advertised the land with "water right and paid-up irrigation charge," were not subject to further payments on the apportioned cost of construction as provided by the reimbursable act of August 1, 1914 (38 Stats. 582) and the collection act of February 1, 1920 (41 Stats. 408). (33 Ops. Atty. Gen. 25, September 2, 1921, Dougherty.)

In this case it was a white man whose rights had vested, under contract with the Government, beyond the possibility of diminution by Congress. Yet the principle is the same as that applied in Choate *v.* Trapp, and the fact that the reimbursable statutes of 1914 and 1920 are in question make the case fairly pertinent.

"Each year thereafter (1905), up to and including 1920 (with the apparent exception of 1911), additional appropriations were made from the Treasury for continuing the irrigation construction work, and each of these appropriations was likewise expressly made reimbursable from the proceeds of the sales of the ceded lands.

"Up to 1914 there was no indication in any of these acts of an intent ultimately to impose the construction costs upon the particular Indians whose lands were benefited by the irrigation systems.

"For many years Congress, in the annual Indian appropriation acts, has been making separate and specific appropriations from the Federal Treasury for numerous Indian irrigation projects. * * *

"Up to 1914 these general appropriations had not been made reimbursable from tribal funds or in any other manner. In the appropriation act of that year, however (act of August 1, 1914, 38 Stat. 582, 583), Congress announced a distinct change of legislative policy (p. 27). * * *

"Thus it was announced that the general appropriations theretofore made and up to that time apparently a gratuity, as well as those thereafter to be made, should be reimbursable from Indian funds, and further that the whole cost of any project theretofore financed by appropriations from the Treasury and made reimbursable from tribal funds was to be apportioned to those individuals of the tribes whose lands were actually benefited. We are here directly concerned with the later provision alone. The former is referred to only as showing how general and radical was the change of legislative policy (p. 28). * * *

"It is clear that now to collect from these purchasers the apportioned cost of construction will be in direct violation of the terms of the advertisements under which they bought their lands, and will result in requiring double payment for the same thing. It may be true that the amounts they then paid do not include the whole actual cost of construction as now apportioned, because at the time of the appraisals the cost may have been underestimated. This, however, was not the mistake or fault of the purchasers (p. 29). * * *

"The sales were to be made 'under such rules and regulations and upon such terms as the Secretary of the Interior may prescribe.' As to sales made prior to the act of August 1, 1914, I can see no possible ground to question his authority to make the sales on the terms and conditions of the advertisements. It was his duty to obtain for the estate the full value of the lands. The cost of the irrigation works was being charged against tribal funds, and there was nothing then to indicate that the burden would ever be shifted to the allottees or the lands benefited. It is clear that after the sale of an allotment the estate of a deceased Indian could never receive any benefit from its actual irrigation. As a member of the tribe, the Indian had a pro rata interest in the tribal funds, and his estate could never realize anything from that part used for irrigation purposes unless his proportion thereof was recouped at the time of the sale by adding the proper amount to the price of the land. It would therefore have been a gross injustice not to include these elements of value in the sale price.

"As to sales made after the act of August 1, 1914, the situation was somewhat different. Your department then had notice that the owners of the irrigable allotments were to be, or at least finally might be, charged with the costs of construction" (p. 33).

This last paragraph suggests that rights vested before the statute of 1914, making charges reimbursable, may be stronger than rights acquired by allotment later than that date.

To summarize: There is practically no direct authority on the point raised. But it would seem as though the principle of Choate *v.* Trapp might well be stretched to protect a trust allotment, guaranteeing a patent in fee "free from all charge or encumbrance," in a case where the following circumstances were present:

(*a*) The allottee survived through the trust period;

(*b*) He belonged to a tribe which had ceded tribal surplus lands, in consideration of which contractual cession its members received the individual allotments;

(*c*) Such individual allotment was completed before the act of August 1, 1914, became effective;

(*d*) Preferably, some of the charges, eventually made reimbursable, had been expended before the allotment and some between that date and the date when the act of August 1, 1914, became effective:

(*e*) The allottee never, expressly or impliedly, consented to a transmutation of the irrigation or other charges from gratuity to reimbursable status; and

In such a case it might well be held that his rights to a patent free and clear was vested beyond Congress' power to impair by direct retroactive legislation or by discretion given to the Secretary of the Interior to shorten the trust period. At all events such a case, presenting the strongest facts, ought to be selected to test out some of the important questions presented by the Government's efforts to collect, as reimbursable, charges originally made as gratuities.

CHAUNCEY S. GOODRICH.

THE AMERICAN INDIAN DEFENSE ASSOCIATION (Inc.),
January 20, 1930.

To the Senate Indian Investigating Committee:

The subject of Indian reimbursable debts is tied up with irrigation and reclamation on Indian lands. The strongest human argument for cancelling much of the Indian reimbursable debt is furnished by an examination of the history and present status of reclamation projects under the Indian Bureau. Examination of the history of these projects shows that the Indian Office through a term of years down to 1929 engaged in a veritable debauch of expenditure, chargeable against the Indians, with equal disregard of engineering considerations, climatological considerations, and economic considerations. The continuance of this reclamation debauch was, as the record proves, made possible through the systematic misinforming of Congress by the Indian Office.

One year ago the American Indian Defense Association prepared an analysis of some Indian Office reclamation projects, through making use of various official reports and of the printed hearings of the House Subcommittee on Interior Department Appropriations.

Thereafter, the Commissioner and Assistant Commissioner of Indian Affairs were retired from office; but the personnel of the irrigation division of the Indian Office has not been changed nor has the service been transferred to the general reclamation service of the Interior Department.

We offer for the record, the condensed statements prepared one year ago.

Respectfully yours,

AMERICAN INDIAN DEFENSE ASSOCIATION (Inc.),
By JOHN COLLIER, *Executive Secretary.*

THE SAN CARLOS APACHE IRRIGATION RECORD

(1) The San Carlos tribal fund has been spent to a net total of $271,992, securing an irrigated acreage of 300. The cost for benefiting each irrigated acre through 1928 was $907.

(2) Seventy per cent approximately of this investment has been expended on structures within the Coolidge Dam Reservoir site. All these structures were placed in the reservoir site beginning two years after the Interior Department possessed the data showing that it was a reservoir site. The whole investment was made subsequent to the withdrawal of the area for reservoir and power site purposes. A substantial part of the investment was made after Congress had authorized (1924) the construction of the reservoir. (Expenditure on Apache irrigation, 1924–1929, $62,156. See House Appropriations hearings for 1929.) In other words, it was foredoomed that even such negligible area as could be irrigated by this project must in large part shortly be destroyed by the Coolidge Dam Reservoir.

(3) The Indian Bureau assured Congress year after year that the value of irrigable land to be brought under this project would be $150 per acre. The Apache Tribe has now been deprived of an area, including this irrigated area, 25 miles long and 2 miles wide at the widest part, stated by the Indian Bureau to contain 563 irrigated acres and 1,100 acres susceptible to irrigation. For this whole area, the tribe has been awarded by Congress $98,094 for agricultural, road, and miscellaneous values. If the Indian Bureau has been telling Congress the truth, in stating that the irrigated land was worth $200 an acre, the award for the irrigated acreage alone should be $112,600, to which should be added $60 an acre for 1,100 acres susceptible to irrigation, or $66,000, and at least some additional amount for the thousands of other acres taken from the Tribe.

(4) Of the above award, $80,000 was instantly reappropriated by Congress for a new irrigation project, on the strength of representations made by the Indian Bureau. (Appropriation act for 1929.) Now, after one year, the Indian Bureau confesses that this new project will be substantially as wasteful and as futile as the earlier one.

(5) Finally, the Apaches' right to the net revenues from the Coolidge Dam power site has been confiscated by Congress on the advice of the Indian Bureau. To this last action the Federal Power Commission likewise has been a party.

All the above actions were taken with no reference to the consent of the Apache Tribe; and the immeasurable failure of the irrigation project is not blamed upon the Apaches—even the Indian Bureau does not attribute the failure to the Indians.

SOME HUMAN-INTEREST ITEMS

The Apaches contribute heavily toward Indian Bureau salaries. From 1920 through 1924 they contributed toward bureau salaries, $268,994. (Taken by the bureau from the tribal fund. See hearings, Senate Public Lands Committee, 1925, pt. 3, p. 238, Senate Resolution 347.)

The Indian Bureau announces that the San Carlos Indian death rate in 1928 was 34.2 per thousand, or approximately three times the general death rate.

During the years when the above-recorded profligacy with tribal funds was at its worst, the San Carlos Apache children in the Rice boarding school (maintained from tribal funds) were fed on a ration costing nine cents a day.

Details and citations follow:

THE INDIAN BUREAU KNEW IT WAS PUTTING THE IRRIGATION SYSTEM WITHIN THE RESERVOIR SITE WHERE IT WOULD SHORTLY BE DESTROYED

(See printed hearings House Indian Committee, 1919, Vol. I, pp. 1016–1017.)

The Army Engineers' report had been made in 1914; the Olberg report two years later. The pumping-irrigation project for the San Carlos Reservation was begun in 1917.

WHAT MR. MERITT TOLD CONGRESS

He stated to the House Appropriations Committee, 1918: "Without this aid, the (Apache) Indians would be practically ruined financially." He was asking appropriations for this pumping-irrigation project. (House Appropriations hearings for 1920, p. 135.)

BUT THE BUREAU GAVE CONGRESS NO INKLING OF THE COSTS WHICH WERE TO BE INCURRED

Chief Engineer Reed, of the bureau, thus described the project to the House Indian Investigating Committee, 1919, Volume I, page 1021:

"There are just a few little pumping plants, one of them pumping from the river; and then there are three or four well-pumping plants, to give them water enough to irrigate to raise a little garden stuff. * * * There will never be a big work on the San Carlos."

CONGRESS AUTHORIZED THE COOLIDGE DAM, THUS INSURING THE DESTRUCTION OF THE PUMPING WORKS AND IRRIGATED AREA, BUT THE BUREAU WENT RIGHT ON

The agitation for the Coolidge Dam ran high from 1920 on and finally legislation was passed in 1924.

Since 1924 through 1929, the bureau has expended $62,156 on the pumping project.

The total cost as stated by the Indian Bureau has now amounted to $271,992. (House Appropriations hearings for 1930, p. 876.)

The results in terms of acreage irrigated were a maximum acreage claimed by the bureau of 1,396 acres in 1925. That claim is evidently false, because elsewhere the bureau reported for the same year that the total irrigated acreage was 595. (See House Appropriations hearings for 1928, p. 187, and for 1927, p. 203.) And for the following year, 1926, the bureau acknowledged that the total irrigated acreage was only 302—216 acres irrigated by the Indians and 86 irrigated by the agency.

Above this figure of 302 acres the area has not gone since.

Thus the per-acre cost, before the project is destroyed by the flooding of the Coolidge Reservoir, will have totaled $907 for each acre benefited.

The asserted crop yield for 1927 was only $9,673, but even that claim, made by the Indian Bureau on page 322 of the House Appropriations hearings for 1929, is contradicted by the Indian Bureau itself, in its testimony before the House Appropriations Committee in 1929. (House Appropriations hearings for 1930, p. 875.) There the bureau states the total irrigated acreage as 300, farmed by 30 Indian families, farming an average of 10 acres per family, and with an average crop value return for each family of $350; in other words, a total crop yield of $3,500. This bureau statement, it may be added, conflicts with another bureau statement on the same page of the 1930 hearings. In sum, the bureau is consistent in stating that the acreage is not above 302, while it variously states the crop yield as somewhere between $3,500 and $10,500.

On the above showing and interchange of views the Apaches' compensation money was told off for the building of transmission lines, incidentally with the omission of any provision of money for the digging of the wells from which the water might be pumped at Bylas.[1]

One year elapses. Mr. Meritt reports (House appropriations hearings for 1930, p. 876): "It is believed that this work (of building transmission lines) will be completed during the 1929 fiscal year."

Then Mr. Clotts, engineer of the bureau, takes the stand. He states (p. 876): "A study of the land at Bylas indicates that it is not of very good quality; that it is rather rough; some of it is encrusted with alkali; and the cost of building the transmission line 26 miles, plus about 6 miles of distribution lines, will make a very high per acre cost, and it is very questionable in my mind as to whether it will be at all advisable to try to locate the Indian at Bylas."

Here is a confusion of views. Once more, the engineering staff of the bureau has got a word into the hearings. And Mr. Cramton remarks, page 877: "Mr. Meritt, do you not think that within another year or two you ought to be able to give us something definite on that situation?" And Mr. Meritt replies: "I think so." Later Mr. Meritt adds: "I will give you a definite answer before the close of the hearings."

Mr. Meritt's definite answer appears on page 880 of the hearings. He states that installation for 1,300 acres is possible but modestly adds: "However, it is probably extremely doubtful that any such quantity of water will be found to make use of all the available land. There should be sufficient to provide homesites and gardens, with perhaps several small tracts of farm land."

Mr. Meritt avoids the subject of alkali and water-logging, but again the engineering force gets in its word, page 878.

Mr. Taylor, on page 878, refers to the Bylas land as "alkali flats" and on page 882, Mr. Clotts, the bureau engineer, presents a frank description: "There is a crust of alkali there, some of it is black alkali so thick that when you walk through it, it feels like partly frozen ground." Mr. Taylor: "It would take years to make that land available and cultivate with it?" Mr. Clotts: "Yes."

Such then is the land to which power was to be taken for pumping for Apache Indian farming. To such use—alleged use (see earlier footnote)—was their $80,000 to be devoted. But Mr. Meritt himself provided the capstone of this amazing testimony.

Be it remembered, that under his persuasion and piloting Congress had authorized $271,000 of Apache tribal money to be used on pumping plants for agriculture, and had then authorized another $80,000 to be used for building a transmission line to pump from future wells for Apache agriculture to take the place of the destroyed farms within the Coolidge Reservoir.

These are Mr. Meritt's words: "This is my idea of the future of the San Carlos Indians. These Indians are now learning to work * * * with the exception of a few of them, these Indians, young, able-bodied Indians, can find employment off the Indian reservation."

Mr. Taylor, of the committee: "They will not want to go back to the old primitive farming?" Mr. Meritt: "No sir, they will be better off. They will use this reservation as a sort of home and they will go off the reservation and make their living wherever they can find employment."

NOW THE PUMPING PLANTS AND THE IRRIGATED AREA WITHIN THE RESERVOIR SITE ARE DESTROYED, AND THE BUREAU AND CONGRESSMAN CRAMTON HAVE AGAIN LEAPED INTO THE DARK

As stated in the foreword above, the Apache Tribe received only a fraction of the compensation or damages which would have been due to it for the Coolidge Reservoir area, assuming that the Indian Bureau had previously told Congress the truth. Be that as it may, the tribe did get an award of $98,094. (Actually the total award was $105,878; the investment exceeding $100,000 in pumping plants and wells recognized by an award of $7,772 to be paid for the destruction of these pumping plants and wells; and Congress actually allowed $98,094—House appropriations hearings for 1929, pp. 291, 299 and 301).

---

[1] The Indian Bureau knew, as shown in its 1930 testimony, that this Bylas pumping project was indefensible. The motive is suggested on p. 300 of the 1929 House hearings where the bureau mentions that "beyond the Bylas district is the Safford Valley, where a fairly large future power market is available. It is believed that the successful future irrigation development of the Safford Valley is dependent upon the use of pumps. This probably future development has been assumed in the estimates (for the transmission line to Bylas)." In other words, the Apaches are to finance a transmission line to sell power from the Coolidge Dam to the Safford Valley region, the profits from such sale to be delivered to the Salt River water users and others downstream, but in no case to the Apaches.

And immediately (1928) Congress appropriated $80,000 of this compensation or damage total, to be used for constructing electric transmission line from the Coolidge Dam to the Bylas district 26 miles away. This transmission line was expected to furnish power for pumping water from existing wells or wells to be dug, to irrigate lieu lands belonging to the Apache Tribe, in place of their lands submerged in the Coolidge Reservoir.

The following dialogue took place in 1927 between Mr. Cramton and Mr. Meritt (House appropriations hearings 1929, p. 301):

"Mr. CRAMTON. What would you say to using these tribal funds (the $98,094 of damage money) to provide transmission lines and other expenses incident to bringing those 1,000 acres under irrigation (1,000 acres alleged to be irrigable in the Bylas district)?

"Mr. MERITT. I think that would be all right."

Then Mr. Meritt became emphatic, as he had become in 1918 when urging the earlier appropriation for the now defunct pumping system. He had said in 1918, as quoted above: "Without this aid, the Apaches would practically be ruined financially." And by following Mr. Meritt, Congress had ruined them to the extent of $271,000. Mr. Meritt now said (p. 301, House appropriations hearings for 1929): "I would like to impress upon the committee the great importance of providing something for these Indians in addition to paying them for the damages to their homes and property. These lands will be flooded within the next year and a half, and then the Indians will need some place to go where they can make a living. I was on that reservation within the last sixty days * * * I was greatly impressed with the need for prompt action to provide a future home for those Indians whose present homes will be flooded."

Mr. Cramton had anticipated this discussion by putting into the record a bureau report stating: "There remains (at Bylas) at least 1,000 acres which would be available for the uses of the present San Carlos Indians."

THE FORT PECK IRRIGATION COLLAPSE

"It would be difficult to conceive of a more hopeless situation than that presented by the Fort Peck Reservation project. It is the opinion of the advisers that the only possible function this project can serve is that of a monument to the futility of attempting to build an irrigation project without a water supply and in a country where the necessity for irrigation at all is questionable. The inconsequential results attained as compared with the large expenditures, nearly $1,000,000, presents a spectacle that is really appalling and humiliating. * * *

"Notwithstanding the expenditure of nearly $1,000,000 ($941,029.17 to June 30, 1927), there was utilized during the last irrigation season (1927) only 2,730 acres of land, and it is complained that the water supply was insufficient for even this small area, although 1927 is rated as a wet year."

The above quotation is from page 116, Volume III, Report of Advisors on Irrigation on Indian Reservations. Filed with the Secretary of the Interior, June, 1928, by Porter J. Preston, engineer Bureau of Reclamation, and Charles A. Engle, supervising engineer, Bureau of Indian Affairs.

Needless to remark, copies of this report were not speeded into the hands of Congressmen by the Indian Bureau.

THE ONLY POSSIBLE ALIBI OF THE BUREAU'S IRRIGATION SERVICE

That alibi would be to claim that the Reclamation Service of the Interior Department, not the Indian Office, is to blame. That alibi is destroyed by the report of the irrigation advisers as well as by Commissioner Burke himself.

(1) The Indian Office, not the Reclamation Service, conceived the project, sponsored it, and got Congress to authorize it.

(2) The Reclamation Service, in this as in a number of projects, acted (until 1924) as construction agent for the Indian Office. Commissioner Burke stated as follows to the House Appropriations Committee (appropriations hearings for 1923, p. 167): "We have our own irrigation service headed by a chief engineer on irrigation and the only instance in which the Reclamation Service are doing any work on Indian reservations is in the nature of contractors."

(3) Five years after the Indian Bureau had inaugurated the Fort Peck project doubts were raised as to the feasibility of the project. The Interior Department thereupon sent out a commission, whose report is dated September 4, 1914, and is published as House Document 1215, Sixty-third Congress, third session. This commission, as stated in the report of September 4, 1914, were "all men who had been connected with the Indian Service as superintendents

of reservations and engineers of irrigation construction work for a number of years, and from daily contact with Indians were in a position to supply first-hand information from personal experience, especially in reference to Indian character, habits, and peculiarities," etc. "Several days," states the report, "were occupied in going over the various irrigation units of the Fort Peck project, including those constructed, partly constructed, and proposed." (See p. 101, Report of Advisers, June, 1928.) This Indian Bureau commission, equipped in the manner above described to render judgment, advised that the work of construction "should be completed at the earliest possible date." What did the Fort Peck Indians tell this bureau commission?

See page 101, advisory committee report of June, 1928. The committee is quoting from this report of September 4, 1914:

"The commission met with about 30 Fort Peck Indians, who can hardly be considered fair representatives of the tribe."

"Some of these Indians objected to initiating construction on new units until it had been demonstrated that those constructed or under course of construction are successful." That would strike most people as being a reasonable idea for the Indians to have, particularly inasmuch as at that time it was their own money, derived from the sale of surplus lands, that was being used for the project. The commission was not at all impressed.

In 1917 the assistant chief irrigation engineer of the Indian Bureau inspected and reported on the Fort Peck project. He "expressed dissatisfaction at the slow progress and urged early construction of the Poplar River Reservoir." (P. 88, advisory committee report, June, 1928.)

In brief, the Fort Peck project, for good or ill, is chargeable to the Indian Bureau.

Indian Bureau psychology is well voiced in the report of its chief engineer, Mr. Code, October 30, 1909: "Justification for expending so large a sum in reclaiming their (Fort Peck Indian) lands could only be on the grounds that it was much better for the Indians and the country at large that their (the Indians') money should be spent in reclaiming the deserts of the West * * * rather than that it should be subsequently doled out to them in cash payments. This, in my opinion, is a strong argument. * * *"

FURTHER REMARKS BY THE IRRIGATION ADVISERS

Their report fills 37 pages of small (typewritten) type, mostly single-spaced We quote its summary portions (pp. 85–86).

"It is the conclusion of the advisers that the Fort Peck Reservation project presents a hopeless situation because of the inadequacy of the water supply. The streams supplying the various units of the project are small, and occasionally are dry at times during the irrigation season. There are no feasible storage sites. The storage already provided is inadequate, unsafe, and excessive in cost.

"Although this project represents an expenditure to June 30, 1927, of $941,-029.17, there was irrigated during the season of 1927, only 2,730 acres, and it is complained that the water supply was inadequate even for this small acreage, and the Government is confronted by a claim alleging damage to crops as the result of insufficient water.

"For the period 1921 to 1927, inclusive, it cost the Government $91,711.71 to operate and maintain this project, and of this amount only $6,775.85, or about 7 per cent, was repaid by water users.

"We are firmly convinced that there is no hope for the recovery of any part of the Government's investment in this project, and that any further expenditures will simply be adding to the loss that eventually must be sustained.

"It is recommended:

"1. That the project be abandoned at the earliest opportunity, and that no further Government funds be expended either in construction or operation and maintenance.

"2. That whatever adjustments are equitably required by the terms of existing contracts with lessees and purchasers of Indian lands, and with homesteaders, be made.

"3. That all construction repayments heretofore collected from individuals be credited to accrued operation and maintenance charges due from such individuals, or in the event no such operation and maintenance charges are due, that amounts collected on construction assessments be refunded.

"4. That, if they desire to do so, the farmers on each of the various units be allowed to operate and maintain the units for their own use, and at their own expense.

"5. That all equipment and material now carried on the irrigation project inventory, including buildings and telephone line, be turned over to the superintendent of the reservation, for such use as he may have for it."

THE KLAMATH, OREG., RECLAMATION RECORD

The Klamath tribal council gave this record through William Barkley, one of its members, before the Senate Indian Investigating Committee (pp. 269–279, Senate committee hearings, pt. 1, November 16, 1928).

Readers of that statement will find it hard to believe, in spite of the circumstantial character of the narrative and the evident careful preparation, presumably with the aid of the Klamath tribal attorney, of the record as furnished by the tribal council.

For example, it is hard to believe that the Interior Department and the Indian Bureau have spent $254,530 net to bring under cultivation 392 acres of land, which means a cost of $651 for each cultivated acre.

It is hard to believe that such profligacy (in a geographical location of very short growing seasons, hence of low agricultural values) has been indulged in exclusively at the expense of the Klamath Tribe, whose tribal and individual timber income secures the obligation.

Like so many statements about Indian matters, the Klamath Tribe's statement has the look of being made in a fairyland or nightmare land. One cries out, as in Ibsen's play "Hedda Gabler," "People don't do such things."

And the Indian Bureau cries out that this is framed-up testimony, ex parte testimony, testimony of irresponsible witnesses, etc.

But the Klamath Tribe understated the facts. Apparently the Klamath Tribe had not been given access to a very important report in the files of the Interior Department. This report consists of three volumes, typewritten, and is entitled, "Report of Advisers on Irrigation on Indian Reservations." The transmitting letter to the Secretary of the Interior shows that the report was made on his instruction by Porter J. Preston, engineer of the United States Bureau of Reclamation, and Charles A. Engle, supervising engineer of the Bureau of Indian Affairs.

These "irresponsible" and "ex parte" witnesses, "seeking to destroy the Indian Service," deal at great length with the Klamath Reservation irrigation record among other records.

First they exhibit for Klamath, as elsewhere they exhibit for many reservations, the fact that Congress was cumulatively misled by the Interior Department in the matter of prospective costs. Under this misleading, Congress first fixed, for the Klamath Modoc project, a maximum authorized expenditure of $155,000, this sum to include $35,141.59 previously expended (act of Mar. 3, 1911). Then (act of August 24, 1912), Congress changed the authorized maximum, making it $155,000, excluding the $35,141.59.

Then (act of May 18, 1916), Congress raised the maximum to $170,000 plus $35,141, or $205,141.

Then (act of May 25, 1918), Congress raised the maximum by $2,000 more.

The above citations are found pages 64–67, Volume III of the report here cited. Have these been allowed to control?

They have not. Operation and maintenance charges have been piled on top of the construction expenditure, making according to these engineers a total expenditure on the Modoc project, to June 30, 1927, of $256,894, from which is deducted a total collection of $1,649 for construction and $715 for operation and maintenance, or $2,364, so that the net cost to the Indians to date stands at $254,530.

What about the acreage brought under cultivation? The Klamath Tribe states that acreage as 392, as quoted above. Did the Klamath Tribe paint the canvas too black in its testimony?

The advisory committee here quoted says "No." On the contrary, according to the Interior Department engineers, the total cultivated acreage (the total acreage actually irrigated) on the Modoc Point unit in 1927 was only 248. That meant a per-acre cost of $1,032 for every cultivated acre (p. 82, Vol. III).

Is the engineering advisory committee of the Interior Department seeking to destroy the Indian Service by misrepresentation? The text of this Klamath report by the committee exonerates them from such a suspicion. The following is an example.

The Modoc Point irrigation and cultivation has steadily diminished from 1922 through 1927 (p. 82). The reduction was as follows:

	Acres
1922	3, 161
1923	2, 750
1924	2, 059
1925	2, 306
1926	358
1927	248

The acreage farmed by Indians, included in the above, diminished as follows:

	Acres
1923	2, 035
1924	1, 960
1925	1, 342
1926	80
1927	62

Why this destructive decline of cultivated area—both of the area cultivated by Indians and the area cultivated by whites? This manifestly is a question of prime interest.

On page 82 the advisory committee quotes the supervising engineer: In 1923 this engineer stated that there were "several reasons" for the decline of Indian cultivation and they were:

"First, the expectation and receipt of some $500 per capita for their timber; second, they do not want to pay construction and maintenance and operation charges. (Comment: These are already a liability against the tribal income.) Third, they do not properly prepare their land for irrigation and do not always plan the crops best suited to the climatic conditions."

Then page 83, the supervising engineer is quoted again, 1927: "The Indians on the Modoc Point project are not progressing, as far as irrigation is concerned; in fact, they are going backward. * * * If it were not for the few white owners and renters I would be tempted to recommend that the headgates be locked for a season or two, which I believe would have an effect on their present attitude."

In other words, ignorance and moral factors are the reason why the Indian cultivated acreage has shrunk as reported by the engineers. Why the white cultivation has shrunk is left to be guessed at.

The advisory committee does not adopt the position of the bureau's supervising engineer, but states, page 83: "Whether the failure (of Indian cultivation) is due to any one of the above named causes or to all of them is of little consequence, as your advisers are convinced that the only use the white man could make of the project is in connection with stock raising, when cattle are shipped in for summer feeding. This means that it must be handled in large areas and under long lease. The Indians can not themselves use their land in this way."

But now we turn to the tribe's own testimony. There is not a hint in the report of the advisory committee which would apprise the reader that water-logging on a destructive, inclusive scale, has taken place, to the extent of virtually annihilating the possibilities of cultivation in this project. The simplest operation in the whole field of irrigation is drainage, and this drainage has been left out by the Indian Bureau. It would suffice, all other factors aside, to destroy cultivation.

Such at least is the circumstantial testimony supported by place, name, date, etc., presented by the Klamath Tribe. And that testimony provides a climax to the indictment against the Indian Bureau as a reclamation agent, of which the foundation and most of the superstructure are furnished by the advisory committee. But the advisory committee ignores this aspect of the situation.

The tribe in their testimony asserted (p. 269, etc., Senate hearings) that these so-called reclamation operations had been carried forward without tribal consent. Under questioning by the committee, the tribal spokesman, Mr. Barkley, modified or explained this denial by the following language which is important enough to quote in its entirety (p. 275):

"In view of the fact that the expenditure of tribal funds for irrigation within the reservation was originally made at the instance of the Secretary of the Interior, and against the wishes of the tribes, and in disregard of frequent protests made from time to time by the Indians; and further in view of the fact that partial consent has at times been given by individual members of the tribe, as a required precedent to the per capita payment of tribal funds withheld by

the Interior Department until such consent for construction of irrigation works should be signed by certain members of the tribe—

"That is the way they put it up to the Indians—

"If you don't sign the agreement for this irrigation project you are not going to receive any more money—per capita payments.

"That is the way it was put up to them. You can find an agreement in Washington that was signed under this understanding.

"Question. That you were compelled to sign, or you would not get any money out of your funds?

"Answer. That is it.

"Senator PINE. Who did that?

"Answer. That was from the time McLaughlin made that agreement, and that was why the Indians protested against the agreement; and that is the way they put it up to them and told them it did not make any difference whether they signed or not, they were going to build the irrigation anyway But he put it up in a smooth way: 'If you sign this agreement you will get more money from your principal held in the Treasury,' so they would have some agreement to show that the Indians did agree to some agreement for irrigation.

"It is respectfully submitted, and the special committee on irrigation goes on record as approving the following: That in justice to the Indians there should be an appraisal of the actual value of the present irrigation works or plant to the lands within the projects, this to be ascertained by disinterested, competent experts—"

On this subject of consent, the advisory committee states (p. 84, Vol. III, Report of Advisors): "It is claimed that the irrigation works were undertaken with the consent of the Indians, but regardless of their consent or action in the matter, they were dependent upon the representatives of the Government for all information as to cost and feasibility; therefore, your advisors are convinced that the Government accepted the responsibility for the irrigation development, and if it now is a failure it would be unjust to take other assets of the individual Indian to pay for the constructed works."

However, the advisors add: "There is no doubt under the law that the Government can recover its investment from the sale of timber and land, if not from the tribe as a whole, then from the individual Indians whose land is benefited by the irrigation works."

The Klamaths, be it noted, from their statement, petitioned that there shall be an appraisal of the actual value of these irrigation works to their lands and that their payments shall be measured by the appraised benefits. That is the petition which the Rio Grande Pueblos have been making and which the Indian Office and the Interior Department have denied them in the Middle Rio Grande conservancy contract as signed.

The acreage cost of reclamation on the cultivated acres of Modoc Point, Klamath, has been quoted as $651, according to the tribe's statement, and $1,032, according to the report of the advisory committee for the year 1927. If drainage had been included and generally if profligacy had been avoided and competent engineering had been provided, so that the acreage which Congress was told was going to be irrigated would have been actually irrigated, then, according to the advisory committee, the construction cost would have been $42 per acre. That sum, the committee states: "Is more than the land is worth." (P. 59.) Such, however, is a purely hypothetical condition, as the advisory committee establishes in its report.

KLAMATH INDIANS FINANCING WHITE BENEFITS

The Klamath Tribe testified (p. 277) at the Senate hearings, regarding the Sand Creek project, as distinct from the Modoc project on the Klamath Reservation: (This project is stated by the irrigation advisors to be exclusively used by whites, and to be irrigated by "wild flooding," and to have had a wild-hay yield valued at $12,000 in 1926, which crop was produced by whites and sold by whites.)

"For this project (the Sand Creek) $25,000 was applied from tribal funds, and is being repaid by landowners at the rate of 35 cents per acre per year (without interest), and they have 20 years to repay the expenditure.

"This project serves lands entirely owned by whites.

"We do not believe it is good business for the tribal funds to be lent for construction of a project for white people, to be repaid in 20 years, without any interest whatever.

"If the Government thinks that is good business, we suggest that the Government itself lend these white people the $25,000 in the same way; and we ask that they return to the tribal funds the moneys advanced in this way for the benefit of white people and not for any benefits to the Indians of this reservation. If the Indians had taken $25,000 and invested it at 5 per cent in 20 years they would receive $25,000 in interest. Under the present practice they are the losers of $25,000."

The advisory committee corroborates the tribal statement so far as the source of the money for the Sand Creek project is concerned (p. 79), stating that the $25,856.55 was taken from tribal funds.

THE CROW, MONTANA, RECLAMATION RECORD

Be it noted that substantially the whole cost of this orgy of extravagance has been taken from the tribal funds of the Crow Indians and is not even theoretically reimbursable to the tribe. The engineers report an accrued operation and maintenance cost of three-quarters of a million dollars and a construction cost of $1,978,934, of which only $235,000, they state, will be found to be reimbursable under the law. The Indians utilize about 4,200 acres under this irrigation system which has cost them more than $2,000,000, but in 1926 they irrigated only 535 acres. There are approximately 12,000 acres of Indian-owned leased land irrigated under the project, bringing, according to the engineers, $2 per acre more of rent than they would bring if not irrigated. This rental gain of $25,000 a year through irrigation goes to individual allottees. Indians farming within the project obtain an average crop yield of $50,000 annually, but their crop yield, the engineers state, is almost equal whether they irrigate or farm by dry farming.

It follows that the income value of this more than $2,000,000 investment to the Crow Tribe or its members is not in excess of $35,000 a year. The acreage cost for the total irrigated acreage, white and Indian, has mounted to about $113, but the acreage cost if the project were considered exclusively Indian would be larger, as above stated.

The summary by the advisory committee of the Secretary of the Interior follows (Vol. II, pp. 202–204):

"*Wasteful construction.*—Money for the construction and for the operation and maintenance of the irrigation works on the Crow Indian Reservation has been taken almost entirely from the Crow tribal fund, the appropriation from the fund being authorized by Congress. It seems apparent that whoever is responsible for the construction and maintenance of this project must have considered that the Crow tribal fund is inexhaustible, as money has been spent with a lavish hand, and seemingly with no thought as to whether the investment in irrigation works can ever be repaid by the lands included in the project. The most noticeable and regrettable feature of this project is the large number and great variety of unnecessarily complicated, and excessively expensive concrete structures, many of which in our judgment are unnecessary, and only add to the difficulties and expense of operating and maintaining the project. The cost of some of these structures, as given by the project engineer is so appalling and amazing as to be almost unbelievable. In certain instances it is inconceivable even after making every possible allowance for complicated designs involving intricate and difficult form work, long haul of materials, high-priced labor, and unsatisfactory weather conditions, how so much money could have been spent on some of these canal structures. As indicating the excessive cost of some of these structures, attention might be called to those on the Lodge Grass Canals. The cost of several concrete drops that were examined on this canal, as given us by the project engineer, much to our surprise, is slightly over $1,100 each. Ordinarily such structures are built for $150 to $300 each.

"In many instances, in our judgment, as on the Lodge Grass and other small canals, many massive concrete structures have been built where there is no need for them, particularly if the canals and laterals had been properly located and the work adpated to local topographic and geologic conditions.

"In many instances, the design of concrete structures is unnecessarily complicated, involving much difficult and expensive form work. Simple and approved styles and types have, in many cases, been discarded for the complicated and unusual, regardless of cost. As an example, the ordinary foot plank has in some cases been displaced by the more artistic and much more expensive reinforced concrete arch-type footbridge.

"* * * Several water-users charge there has been criminally wasteful expenditure of funds in building many useless and unnecessary structures, such

as drops, checks and culverts, such as for example on Lodge Grass and Big Horn Canal, as well as on other canals. Both Indians and whites claim that work by the Government costs two or three times what it should, as men leave home about 8, drive 10 or 20 miles to work, and always quit work to get back home before 5 p. m.

"*Irrigable acreage under constructed works.*—Here, as on many other reservations, it is complained, and in fact it is quite apparent to your advisers, that the irrigable acreage now reported is considerably above the acreage that is in reality actually irrigable. In some cases, land that is nonirrigable because of its unsuitable topography, or other adverse conditions, is now classed as irrigable, and, in many instances, land for which there is not an adequate water supply is classed as irrigable.

"It is frequently apparent that the irrigable acreage is purposely exaggerated in order to justify increased appropriations for carrying on the work. Some day there will have to be an accounting, and then it will be found that the area actually irrigable is much less than reported, and the irrigation costs will be correspondingly greatly increased. As an instance of this, it was complained to your advisers that the area now reported as irrigable on the Pryor Creek—Lost Creek unit of the Crow Reservation is twice or three times the area that can ever be irrigated, because of the gravelly land that requires excessive quantities of water.

"*Excessive operation and maintenance cost.*—The construction cost of the project to June 30, 1927, was approximately $2,000,000 ($1,978,934.99). As compared with this it will be noted that the operation and maintenance cost to date is unusually high, being $1,011,284.58.

* * * * * * *

"It is noted that the operation and maintenance costs for this project, considering its area, have in some years been excessive. As an instance, in 1923 the operation and maintenance cost, with 30,011 acres reported as irrigated, was $102,114.60 or about $3.33 per acre for the acreage irrigated, or nearly $2 an acre for the acreage under constructed works.

* * * * * * *

"On this project, as on many other of our northern projects, particularly in Montana and Wyoming, ditch riders are carried on the pay roll for the entire year, although the irrigation season during which they are required to ride ditch is less than half the year. This matter has been the subject of bitter complaint by the farmers of this project—both Indian and white—for many years. The Indians particularly complained very bitterly against the expenditure of their tribal money for paying salaries to so-called ditch riders, who, as they state, "can only sit by the fire and smoke a pipe" for several months during the winter. It is the judgment of your advisers that this is a matter that should have been adjusted long ago. There can be no justification in reason for the employment of men as ditch riders where the irrigation is so short, as on this project. On projects considerably farther south and with a correspondingly longer season than here, ditch riders are employed only during the season. The same practice should have been adopted here long ago, as it would have meant a saving of several thousand dollars each year."

Part of the Indian Office Record Before Congress with Respect to the Crow Irrigation

December 16, 1920, Mr. Meritt went before the House Appropriations Committee and requested $200,000 from the Crow tribal fund to be expended on the Crow irrigation project. He stated: "We consider this a very successful irrigation project." Mr. Ellston of the committee stated: "This is a very successful operation and it will bring a great return to the Indians, will it not?" Mr. Meritt replied: "It will." Mr. Meritt stated that the Indians were cultivating 11,244 acres and the Indians and whites together were cultivating 36,672 acres.

Mr. Meritt further stated: "It is desired further to enlarge and extend the present systems on this reservation so as to provide for additional land, which can be leased as rapidly as the irrigation system is extended to supply the water thereto." The committee recommended and Congress voted the $200,000.

Then, on December 16, 1921, Mr. Meritt appeared requesting another $200,000 from the Crow tribal fund. He explained for the first time—having neither volunteered the information nor been questioned about it the preceding year—that $150,000 of the preceding year's appropriation had been for the construction of a diversion dam on the Big Horn River. He stated that the irrigated land cultivated by Indians had increased from 11,244 in 1920, to 16,081 acres in 1921.

and the total irrigated acreage had increased from 36,671 acres to 45,184 acres in 1921.

He stated that the $200,000 now being asked will be used, $100,000 for new construction and $90,000 for operation and maintenance. He stated, page 373, House appropriations hearings for 1923:

"We will increase the acreage considerably * * *

"Mr. CARTER. Will your Big Horn River Dam be sufficient to take care of these 20,000 additional acres? (Acres within the project not yet irrigated.)

"Mr. MERITT. We think so. We have expended a very large amount of money on that project, over $1,600,000, and none of this money has come out of the Treasury of the United States; it has all been constructed out of Crow tribal funds. The Indians are making such a splendid showing on that reservation that we feel we should encourage them in every way possible. You will note that in the last year they have very greatly increased the amount of land cultivated; they have made an increase of nearly 5,000 acres. I think that is a remarkable showing * * *"

We now pass to the year 1922 when Mr. Meritt appeared asking for $175,000 from the Treasury—reimbursable (the Crow tribal fund having now been devoured by the irrigation operations and the administrative requirements of the Indian Office).

The $175,000 was, of course, to be reimbursable to the United States. (Most of the approximately $2,000,000 taken from the Crow tribal fund for this project is not reimbursable to the tribe.)

Mr. Meritt's promise about increased acreage through the expenditures of the two preceding years has been quoted, but his justification shows no promise fulfilled. The area under constructed works was 53,000 acres, the same as the preceding year. The area irrigated has shrunk from 45,184 acres to 36,907 acres. The Indian cultivation has dropped from 16,081 acres to 12,576 acres. Mr. Meritt proffered no explanation whatever and none was demanded. His request for the appropriation was granted.

Passing to the year 1923. Mr. Meritt appeared as usual and asked the committee for $150,000. His justification showed 53,000 acres under constructed works, identical with the preceding years and only 30,011 acres irrigated and only 9,803 acres cultivated by Indians.

Evidently Mr. Cramton and his committee were not interested in comparing the promises and fulfillments of these succeeding years. After inconsequential remarks had passed back and forth, the committee gave Mr. Meritt what he wanted. Supervising engineer, Mr. Reed, of the bureau, volunteered the information that the operation and maintenance requirement was now $100,000 and the additional $50,000 would be used for new construction.

In 1926 the bureau gave no new light. The committee demanded no explanation. Without freighting this recital with the subsequent record, we come to the report of the irrigation advisers to the Secretary of the Interior, filed June, 1928. There the total irrigated acreage is stated to have been, for 1924, 20,372 acres, and in 1926 it had shrunk to 8,369 acres. The total irrigable acreage—acreage now under constructed works—was 56,163 acres in 1926, substantially, an infinitesimal alleged increase over the years from 1920 down. The Indian irrigation in 1924 had fallen to 4,989 acres, in 1925 to 2,703 acres, and in 1926 to 535 acres. The engineers state emphatically that the estimates which they had taken from the Indian Office are exaggerated—padded.

The above record speaks for itself but it should be read in conjunction with the summary of findings of the irrigation advisers of the Secretary of the Interior, excerpts from which accompany this statement. That summary points out what facts of more sensational and even sinister character than the ones dealt with immediately above have been withheld from Congress or misrepresented to it by the Interior Department and the Indian Bureau.

THE FORT BELKNAP (MONT.), IRRIGATION FIASCO

First the facts are given. They are given as set forth in Volume II, report of the advisers on irrigation on Indian reservations, transmitted to the Secretary of the Interior, June, 1928, signed by Porter J. Preston, engineer of Reclamation Service, and Charles A. Engle, supervising engineer of the Bureau of Indian Affairs. Then the Indian Bureau's fictions are quoted.

The Fort Belknap project, reimbursable, has cost $597,344 through 1927.

The project contains a total irrigable acreage of 16,975 acres, of which 12,133 are actually irrigated but only 2,512 are cultivated. The Indians cultivate 1,805 of the above total acreage (p. 6).

The total value of the Indian crop yield from cultivated acreage in 1926 was $29,390 (p. 24). The number of Indians farming was 139.

The project falls into two groups of structures: (1) The Milk River unit, which has cost $365,598, and (2) various outlying reclamation structures which have cost $231,756.

The irrigation advisers report that the outlying structures are hopeless from the standpoint of ever producing enough to return the Government investment. Indeed, they indicate that these outlying structures will continue to pile up net deficits for operation and maintenance and they recommend (p. 1). "That no further construction or operation and maintenance work involving Government funds be performed at any of the units of this reservation other than the Milk River Canal unit."

They recommend that all construction on the Milk River Canal be stopped but that operation and maintenance be continued, stating (p. 10): "It is believed by the advisers that there is a possibility of collecting a substantial part of the cost of the Milk River unit provided that (1) it is possible to lease all land not being cultivated by Indians to good farmers; (2) the repayment period be extended to 40 years; (3) this unit be completed and properly operated and maintained." Without so stating, the advisers imply that construction work should be resumed only after an economical and efficient operation and maintenance have been established.

The advisers place squarely on the Indian Bureau the failure of the Milk River unit, which they explain as being not an engineering failure primarily, but an administrative and human failure. They state (p. 36): "The Indians on this reservation have never received that intelligent, well-sustained instruction, assistance, and encouragement that farmers in general have come to recognize as essential to their welfare."

The advisers cry out against the extravagant operation and maintenance costs on this as on other Indian Bureau projects (p. 37):

"This project is burdened with an overhead charge for regular employees entirely out of proportion to the results attained. Four regular employees—a general foreman, foreman, and two ditch riders—are all on the pay roll for the entire year. Their salaries aggregate over $6,500 and, added to this, the value of perquisites, house rent, fuel, lights, etc., supplied by the Government. * * * The advisers can see no justification for employing ditch riders for the entire year in a country with a growing season of four months. The Indians complain that in the winter these ditch riders 'loaf' and draw their pay."

If such employment is not an oversight, it, in the opinion of the advisers, "amounts to criminal negligence on the part of whomever is responsible."

The advisers protest against the "faking" of statistics about this, as about other Indian Bureau reclamation projects. "Not only on this reservation, but on most of the reservations considered in this study, it was noted that there was an almost universal tendency on the part of employees, in the compilation and preparation of reports and justifications, to be extremely optimistic. Fact frequently is so richly embellished with fancy that the picture fails to give an accurate idea of the true conditions. * * * A feeling or a realization on the part of many employees—apparently but unwittingly and unintentionally encouraged by the Indian Office—that tenure of employment, salaries, and promotions, all depend upon the fact as to whether each successive report shows an improvement in the conditions described in preceding reports." And much more to this effect.

As to the padding of the statistics of cultivated acreage with statistics of acreage producing only wild hay, the advisers state (p. 37): "The value of the principal crop at Fort Belknap—wild hay—is but little more than the actual cost of harvesting and stacking." (With no regard for construction, operation, or maintenance costs.) "For example, the return from the wild hay for 1926 was $3.23 per acre, while the cost to the Indian for harvesting and stacking was $2.50 per acre."

The per acre cost for construction and accrued operation and maintenance for the cultivated acreage now totals $238—total cost $597,344; total cultivated acreage, Indian and white combined, 2,512.

WHAT THE INDIAN BUREAU HAS TOLD CONGRESS ABOUT FORT BELKNAP THROUGH RECENT YEARS

December 16, 1920, Mr. Meritt addressed the House Appropriations Committee (p. 339 printed hearings on the House appropriation bill for 1922). He said: "The Indians have ample property to secure money advanced by Congress. You will observe that the Indians are making a splendid showing under this

irrigation project, in the amount of land cultivated by Indians—17,028 acres out of 17,158 being actually irrigated."

Mr. Meritt asked on this showing for $30,000 and got it. At this point it may be stated that the bureau has obtained the following sums from Congress for the Fort Belknap project since 1921: 1921, $30,000; 1922, $30,000; 1923, $25,000; 1924, $25,000; 1925, $30,000; 1926, $25,000; 1927, $20,000; 1928, $18,000; 1929, $20,000; total, $223,000.

NOTE.—That the cultivated acreage in 1926, was only 2,512. Through the expenditure of $155,000, the bureau had diminished the cultivated acreage from 17,028 to 2,512 and had diminished the number of Indians cultivating, from 358 to 139. Comment: i. e. Such would be the case if the bureau's own statistics were believed.

In 1921, the bureau told Congress that the Indians were cultivating 15,424 acres. In 1922 they told Congress that the Indians were cultivating 15,114 acres. In 1923, they were cultivating, according to the bureau, 15,715 acres; in 1924, 13,762 acres. In 1925, Mr. Meritt told the House committee: "Farming operations are being extended and about 300 heads of (Indian) families are thus engaged."

But in 1925 an accident occurred. Mr. Hanna, of the Indian irrigation service, appeared before the Appropriations Committee and unwittingly contradicted Mr. Meritt. He told the committee that only 133 Indians were farming and that the total cultivated area of the project was only 2,643 acres.

Mr. Hanna's debunking statement constrained Mr. Meritt in the following year, 1926, to present a debunked tabulation to Congress. The number of Indians engaged in farming became 139; and the word "irrigated" was substituted for the word "cultivated." However, Mr. Meritt was loath to exhibit the realities and gave no information as to what part of the irrigated area was actually cultivated. As in the preceding year, so in 1926, Mr. Cramton failed to be interested in the discrepancies. Mr. Reed affirmed regarding operation and maintenance cost: "We are keeping it down really below good and efficient management."

COMMENT.—Note what the irrigation advisors say about extravagant operation and maintenance costs at Fort Belknap.

Through all these years the hearings show that the Indian Office, in addition to the affirmative misrepresentations quoted above, has left Congress in the dark as to the status of the isolated projects on the reservation, on which $231,756 have been expended, and which are now declared to be totally hopeless by the irrigation advisors, and which, according to the irrigation advisors, should be abandoned forthright and no more operation and maintenance expenditure placed on them.

COMMENT.—The Fort Belknap project is not one of the great big Indian Bureau projects. However, it does matter to the Indians that their lands have been burdened with a debt of $597,000, representing a reimbursable expenditure of $238 for every cultivated acre. The irrigation advisers state that the value of these cultivated acres is $50 and that the value created by irrigation is $40.

And it does or should concern Congress that it has been led in this case—one of a large number of cases—to appropriate $223,000 on the basis of a misrepresentation carried out by the Indian Bureau through spoken words and written tabulations presented to Congress each year through an 8-year period.

MISREPRESENTATION TO CONGRESS WITH RESPECT TO THE BLACKFEET AND YAKIMA IRRIGATION PROJECTS

The advisory committee, June, 1928, reports to the Secretary of the Interior as follows concerning the Blackfeet project:

A. *Blackfeet.*—"Another instance of incomplete data that not infrequently characterizes the Ineian irrigation service justifications is noted in the discussion of the Blackfeet project, appearing in the congressional subcommittee hearings on the Indian approprlation bill for the fiscal year 1929, wherein there is included some statements of a general nature, and then instead of disclosing the conditions actually existing (that the Indias are making practically no use of the irrigation facilities provided by the Government project, having irrigated only 45 acres during the season of 1926), which apparently are purposely omitted, the statement is made: 'Some of this land is irrigated by Indians and more will be.' In the face of the fact that the acreage utilized by Indians has been rapidly decreasing for some years, we can see no justification for the optimistic statement 'more will be.'

"It is on such misinformation as this that Congress is expected to legislate and appropriate money for some of these irrigation enterprises." (P. 247, Vol. I.)

B. *Yakima.*—"We are inclined to the belief that as a result of failure on the part of the Indian irrigation service to include complete and detailed information in justifications for appropriations, Congress sometimes appropriates funds for irrigation activities without a thorough understanding of the work contemplated.

"As for instance, it is noted in the hearings on the Indian bill for the fiscal year 1928, request was made for an appropriation of $520,000 for the construction of certain pumping units on the Wapato project of the Yakima Reservation; and the statement is made that the work contemplated will reclaim 20,000 acres of land adapted to fruit and potatoes, increasing the value of the land from $1.50 to $150 per acre by the expenditure of $26 per acre.

"In the face of this, however, we learned in our study of this project, that the actual estimated cost of the work proposed for reclaiming the 20,000 acres is approximately $1,500,000; and that the plan now adopted and being carried out calls for an expenditure of $533,000—a little more than the amount appropriated—to reclaim 10,880 acres instead of 20,000 acres as set up in the justification." (P. 243, Vol. I.)

Senator WHEELER. I would like to ask Mr. Rhoads a question. Is this appproriation that you are asking for the Blackfoot Reservation to be made a lien on the Indian land out there?

Mr. RHOADS. I am informed that the same has been passed and follows out the general law, that it must be reimbursable.

Senator WHEELER. Are you asking for an appropriation this year for the Fort Peck irrigation system?

Mr. RHOADS. In the deficiency we are recommending a reorganization of that project.

Senator WHEELER. And you are asking for an appropriation for that, are you?

Mr. RHOADS. It has been cut to $5,000 for operation and maintenance.

Senator WHEELER. Will you furnish me with a statement as to just what you are asking for irrigation on the Fort Peck, Flathead, Blackfoot, Crow, and Fort Belknap Reservations in Montana?

Mr. RHOADS. In the deficiency act, or——

Senator WHEELER (interrupting). I want them in both.

Mr. RHOADS. Yes, sir.

The CHAIRMAN. Captain Bonnin, do you wish to make a statement?

Captain BONNIN. Yes, Mr. Chairman.

STATEMENT OF CAPT. R. T. BONNIN, SECRETARY NATIONAL COUNCIL OF AMERICAN INDIANS, WASHINGTON, D. C.

Captain BONNIN. The purpose of my statement here is more or less to confine myself to one reservation to show what the conditions are on account of these heavy reimbursable debts, and I picked the agency where I had spent something like 15 years myself and know what I am talking about, at least, I think I know. Then, supplementing that, I am relying on reports made by various departments of the Government, and the reason I am taking your time, or want to take your time just now, is because development work is going on to-day with respect to other Indians by the same man who conducted the development work at this agency, and my understanding is that there was something in the neighborhood of a half million and odd dollars spent down there in the Pima country—clearing, plowing, leveling, and preparing the ground for those Indians to farm.

This work, I understand, is under the management of a superintendent by the name of Albert H. Neal, who did the work of clearing, plowing, and leveling for the Utes in Utah. He was considered at the time one of the best superintendents in the service, and I think he is still so considered. But in view of the situation that the Utes are placed in to-day it would be well at least to consider carefully what happened in the Ute case before too much is done down in the Pima country along the same line, or we will find the Pimas so badly in debt that they will never be able to get out of it.

I have a memorandum that was prepared by Mr. Burke, when he was the Indian Commissioner, for the Secretary of the Interior, in answer to some letter of inquiry from some one on the outside, with respect to the Utes' funds and how they had been expended, and he shows in his memorandum that, under what he terms a "comprehensive plan of campaign to clear, plow and level" these Indian lands, there had been spent over two million and odd dollars. I have got the exact figure and I will hand it in later on a piece of paper. In addition to that amount of two million and odd dollars, they put in this expensive irrigation system for the Utes under the act of Congress of 1906, and, according to a report of Congress prepared by the Indian office, they gave a schedule of all the different projects, irrigation projects, the amount of money expended, purporting to give the figures from the time they started up to and including June 30, 1927. With respect to this particular agency of the Utes in Utah it showed that they had spent over $1,800,000. That was reimbursable against the tribe, as the act originally provided, but that act was passed in 1906, and, as Mr. Collier stated here, there was another act passed in 1914, which was retrospective, and up to that time the Utes had been allotted, so apparently it has been switched over from the tribe into individual allotments. But, at any rate, the amount spent up to 1927 for clearing, plowing, and leveling amounts to over $4,000,000. The records also show that these Indians were allotted a total of 99,407 acres, but I had a larger figure, and took for granted that if there were 100 acres improved, the total expenditure being over $4,000,000, it would show that there had been over $40 per acre spent on these Indian allotments and charged to the Indians. Consequently, after that there were Indian lands offered for sale, in most cases heirship lands. I had before me one of the advertisement sheets showing the Indian lands offered for sale and I ran over a few of them to see what those lands were selling for, because I recall when I was out there they had been selling land at $15 an acre, notwithstanding that it cost them $40 an acre to improve it. This land was for sale in 1926, and the prices ranged from $2.50 to $40 an acre.

The CHAIRMAN. Was that after the expense of $40 an acre for the irrigation project had been incurred?

Captain BONNIN. It was, because the report of the Commissioner of Indian Affairs showed that there had been spent over two million-odd dollars to clear, plow, and level the land. That was prepared in 1925. This land sale was being advertised in 1926, and it shows under what irrigation ditch the land came, and so on; but, nevertheless, the land was being offered at these low prices. The highest price that was asked for it was only half what it cost. Mr. Neal did all this improvement work on there for the Utes. It was really his plan. It was his plan to save the water rights for the Indians by

using this vast amount of money. While it was not all reimbursable—the department might say that it was not reimbursable because it was appropriated for irrigation by Congress. When you go into that you will find that in 1910 the court rendered a judgment in favor of these Utes in the amount of $3,000,000. The Utes are divided; part of them are in Colorado, and part of them are in Utah. The Utes in Utah that I am speaking of comprise a little over two-thirds the total on the reservation, so they got a little over two-thirds of this amount distributed to their credit. Mr. Neal went there in 1915 and that judgment was not made available until after he got there. He evolved the plans, and the department approved them, whereby if this money could be made available for use in clearing, plowing, and leveling the land, and for building houses and roads, this land would be improved to such extent that the water rights could be saved.

The CHAIRMAN. Was this $40,000 reimbursable?

Captain BONNIN. It was not. It was a wrongful use of these Indians' money, to my mind. Now, the sale of the lands for less than half the cost——

The CHAIRMAN (interposing). Was there a lien against that land?

Captain BONNIN. Almost $2,000,000 for irrigation construction, the cost of operation and maintenance, is all charged to their land.

The CHAIRMAN. Then, when it was sold, wasn't the amount of the lien against it payable above the amount that is indicated there?

Captain BONNIN. That feature of it was covered by this report which was made to the President of the Senate under date of February 28, 1929, by the Comptroller General of the United States. While his report was general he somehow just happened to strike this out. This is covered quite in full on page 71 of this Senate Document No. 263, and at this page where he speaks of those riembursable debts he states that these charges against these Indian lands could not be collected now because the debts were much greater than the value of the land. And he sets out in detail what happened and describes pretty much what I told you about clearing, plowing, and leveling there, which permitted them to bring about this condition.

Senator WHEELER. What do you think ought to be done about it?

Captain BONNIN. Right at the present time I think something ought to be done about this Pima situation which is being developed to-day by this very man—Neal.

Senator WHEELER. What do you think ought to be done?

Captain BONNIN. He ought to be made to confine himself to what the land might reasonably bring upon the market, after being reasonably developed. That was why I brought it up to-day. This other matter is pretty much true of the other Indian reservations. They are charged for such a heavy debt that they can not ever expect to get out of it. The charge is greater than what they are selling it for, and the Indian can get nothing.

Senator WHEELER. Let me ask Mr. Rhoads. My understanding was that you were going to recommend to Congress that all these funds that have been charged as reimbursable against Indian lands should be done away with; that is, eliminated, or charged off. What about that, Mr. Rhoads?

Mr. RHOADS. I don't think we know enough about it at the present time to make a blanket recommendation like that. We merely

wanted to call attention to the situation as it exists. Part of it is due to definite legislation that we had to follow.

Senator WHEELER. What definite legislation do you have in mind?

Mr. RHOADS. We are seeking light, Senator, with a view to solving the matter.

Senator WHEELER. I was wondering whether or not you would meet with opposition, for instance, if you sought to make a recommendation to Congress that it be done away with.

Mr. SCATTERGOOD. That certainly was the aim we had in mind—of urging that.

Senator WHEELER. I am going to oppose it, so far as the Senate is concerned, and so far as Montana is concerned, for we don't get a 5-cent piece, and I am going to try to stop it going through the Senate. I don't think it is right. I think it both legally and morally wrong, and am not going to stand for it. Of course the Senate might override me, but surely I am going to oppose it.

Mr. RHOADS. You are going to oppose all reimbursable funds?

Senator WHEELER. I am going to oppose all reimbursable funds, so far as the Reclamation Service is concerned, on this land, making it a lien on Indian lands where they have trust patents.

Mr. RHOADS. That would help us right away, because it would bring the situation to a focus, and that is what we are trying to do. We are trying to find out whether we are correctly interpreting the views of Congress.

Senator WHEELER. I think, frankly, if you feel that way about it, if you feel that it is morally wrong and legally wrong, and made such a recommendation to Congress, or if the President would make such a recommendation as that to Congress, that it would be done. I am not complaining because you don't do it, but if you feel that it is morally and legally wrong, as you conceive it to be, I think it is the duty of the administration to recommend that, because if you just go ahead and make recommendations and permit it to be done, your verdict will interpret that that is what you want done.

Mr. RHOADS. We are not trying to dodge responsibility. We feel that the acts of 1914 and 1920 indicated to us that it is the policy of Congress. Now, we have a certain hesitancy about questioning that, and that is the reason we raised the issue, to make sure we understood each other. Congress may have been misled by the attitude of the Indian Bureau in the past. I am not even prepared to admit that. I think possibly it may have been a mutual misunderstanding.

Senator WHEELER. I am not sure that it was the fault of the Indian Bureau any more than it was the fault of Congress. Frankly, I think that in many things the Indian Bureau has been blamed for, Congress has been equally at fault, but if, for instance, the administration would make a definite recommendation, then surely there couldn't be any blame placed upon them, and if Congress goes ahead and does it in spite of the recommendation of the Indian Bureau, then the blame can be placed exactly where it should be placed. That is the thing I would like to see done, and I feel, frankly, that if the administration should make such recommendation and say that that was their view about it——

Mr. RHOADS (interrupting). May I make one further remark, as to why this situation comes into it here? We were practically new and unless we followed the past methods we couldn't get by the

Budget, and we couldn't get by Congress, without a mutual understanding.

Senator WHEELER. I appreciate the situation and sympathize with you in your position.

Mr. SCATTERGOOD. You know that the Budget eliminates all matters of general legislation. If we changed the form and tried to bring in general legislation by getting an appropriation for the continuance of these necessary items, they would put them back again along the old line, and we would have to go to Congress after all, and that is what we are trying to do, in the form in which it has been presented.

The CHAIRMAN. Have you any further statement, Captain Bonnin?

Captain BONNIN. I would like to say with respect to the canceling of the debts, as respects these particular Utes that I talked to, I was out there in 1928 and had a long talk with the man in charge of irrigation on the reservation, and he stated that he thought there was some error made in lowering these Indians and scattering them all over that broad territory and merely giving them 40-acre tracts which necessitated building so many canals when one canal system could take care of them all. In justice to the Indians, the construction charges and the operation and maintenance charges should be stricken off. He said he didn't blame the Indians for not caring to make any further improvements on their lands and lose the whole thing. He said that the debt was greater now than that land would bring if put on the market. He is the Government agent on that reservation, with full power to handle irrigation matters, separate and apart from the superintendent. He is in charge of the Indians, and, in my mind, where Government officials, who are right on the ground, take the attitude that some cancellation of that kind should take place, I think it ought to be done. It is true they need water to raise crops in that country. It is different from what they have in Montana, where they probably raise crops without irrigation. In Utah there is very little farming carried on, if any, except dry farming.

The CHAIRMAN. Mr. Crawford.

STATEMENT OF D. W. CRAWFORD, CHAIRMAN BUSINESS COMMITTEE, KALMATH INDIAN RESERVATION, CHILOQUIN, OREG.

The CHAIRMAN. You represent the tribal council of the Klamath Indians here?

Mr. CRAWFORD. Yes, sir.

The CHAIRMAN. Tell us briefly of the expression of your people in regard to the reimbursable items that have been charged up against your tribal funds.

Mr. CRAWFORD. Mr. Chairman and gentlemen of the committee, I am able to tell you the exact amount. I have been representing the Indians down here for the past three winters and I have gone to the Indian Bureau asking for information as to how much of our tribal funds was put into the different projects on our reservation. I think there has been something in the neighborhood of $361,000 put into the different projects. As late as yesterday I was down there trying to find out exactly how much of our tribal funds have been put into these different projects, and I was unable to get that information. A year ago this winter I asked for the same information and they informed me that they didn't have it but that they had written for

it, and yesterday Mr. Walker, in the irrigation division, informed me the same thing, but that he would wire Yakima for it because he didn't have the information we wanted.

Mr. Chairman, I am very much interested in the irrigation projects on the Klamath Reservation. There are several questions I would like to ask. First, I would like to know how much of our tribal funds is in these different projects.

The CHAIRMAN. According to this statement of June 30, 1928, there has been a total amount appropriated of $204,795.17, and the amount used is shown as $194,790.07. These, of course, are not tribal funds, these are the reimbursable amounts.

Mr. CRAWFORD. Mr. Chairman, I do know that there has been approximately $194,000 spent on the Modoc Point project which has not been of any benefit to the Indians. The acreage charge is approximately $32 an acre for construction and maintenance.

The CHAIRMAN. Why do you say it has been of no benefit to the Indians?

Mr. CRAWFORD. It is more than the land is worth in several instances. There are 6,000 acres under this project and the report the farmers made this past summer shows that the farmers irrigated only about 400 acres in this 6,000-acre project. The rest of the land has never had a drop of water on it, but still it is charged to the land owners.

The CHAIRMAN. Wasn't there sufficient water to go around, or wasn't it needed or requested, or what?

Senator PINE. Some of the land is above the level of the ditch, isn't it?

Mr. CRAWFORD. Yes, sir; and some of it is low alkali land that hasn't proper drainage.

Senator WHEELER. The more water you put on alkali land the worse it gets, isn't it?

Mr. CRAWFORD. Yes, sir.

Senator WHEELER. So that instead of being a benefit it is a detriment.

Mr. CRAWFORD. Yes, sir. A question I would like to ask is, who owns the water on our reservation? The reason I ask this question is that there are a number of lumber companies that have built dams across the river.

Senator WHEELER. How big is the river?

Mr. CRAWFORD. I would judge the river to be about 40 feet wide.

The CHAIRMAN. The river is not what would be known as a navigable stream?

Mr. CRAWFORD. No, sir, it is not. They have fish ladders in these dams they are building across the river and they prevent the fish from coming up the river.

The CHAIRMAN. Did the lumber companies who have built dams get permission from the Interior Department to do so, or don't you know?

Mr. CRAWFORD. I don't know that.

The CHAIRMAN. I take it they never got permission from your Indian council.

Mr. CRAWFORD. They never got permission from our Indian council.

The CHAIRMAN. Was any of these propositions taken up with your council before the dams were built?

Mr. CRAWFORD. No, it never was taken up with our business committee. Our business committee was never consulted in regard to

these matters. Now, one of the lumber companies, the Campbell-Towle Lumber Co., is sawing their logs in the river and the sawdust gets in the water and kills the fish. We would like to know whether that is within the law.

Senator WHEELER. Are they paying you for the use of it? Are they lumbering on the reservation?

Mr. CRAWFORD. Yes, sir.

The CHAIRMAN. And they are paying the Indians for the logs?

Mr. CRAWFORD. They are for the stumpage, yes, sir, so much a thousand for the logs as they are scaled.

The CHAIRMAN. Confine your remarks, Mr. Crawford, to the reimbursable proposition, at this time. We want to get any statement you have to make in regard to that.

Mr. CRAWFORD. Well, there is something over $363,000 that is charged to the land on the different projects on the Klamath Reservation, and I think it is unjust to charge those Indians with construction and maintenance charges. The charges far exceed the value of the land in several cases.

The CHAIRMAN. Are any of the projects on your reservation of benefit to the Indians?

Mr. CRAWFORD. I think some of the miscellaneous units have benefited a few Indians, but taking the Indians as a whole, they have not.

The CHAIRMAN. Do you know approximately the number of Indians that are using the water right on their land on your reservation?

Mr. CRAWFORD. No, sir; we haven't that information.

Senator WHEELER. Are they asking for further appropriations?

Mr. CRAWFORD. Yes, sir; this year they are asking for $3,500 to be spent out there for maintenance.

Senator WHEELER. Thirty-five hundred?

Mr. CRAWFORD. Yes, sir.

Senator WHEELER. That isn't very much.

Senator PINE. This report of the work committee shows construction costs of $277,753.38, of which $6,157.20 has been collected, leaving a balance of $271,596.18 unpaid. Now, the O. and M. costs total $69,249.09, of which $6,686.56 has been paid, leaving a balance of $62,562.53. The last statement covers operation and maintenance costs of the three projects on the reservation, that is, the Modoc Point, Sand Creek, and miscellaneous units.

The CHAIRMAN. Have you any further statement, Mr. Crawford?

Mr. CRAWFORD. In conclusion, I would like to ask the committee to give the irrigation projects very close consideration and investigate the entire situation. I would also like to thank the committee for this opportunity to present my statement of conditions as to the irrigation projects on our reservation.

The CHAIRMAN. Superintendent Arnold, of the Klamath Reservation, is here. We would like to have a statement from Superintendent Arnold.

STATEMENT OF L. D. ARNOLD, SUPERINTENDENT KLAMATH INDIAN RESERVATION, KLAMATH AGENCY, OREG.

The CHAIRMAN. Mr. Arnold, you are the superintendent of the Klamath Reservation?

Mr. ARNOLD. Yes, sir.

The CHAIRMAN. We would like to have a statement from you in a general way in regard to the use of the reimbursable funds, especially on the irrigation projects there. First, how long have you been at the Klamath Reservation?

Mr. ARNOLD. Since July 1, 1925. I am not familiar with the irrigation projects prior to that time, and the records in regard to these projects are kept at Yakima, Wash., under the supervision of the irrigation branch of the Indian Service. Therefore, I am not in position to make any statements in regard to the amount of money spent, or the collections, excepting that I am the collection agent there and make the collections as the bills are submitted to me.

Senator WHEELER. That is, for irrigation?

Mr. ARNOLD. Yes, sir.

Senator PINE. Can you say whether it is a success or failure?

Mr. ARNOLD. Under present conditions it hasn't been a success.

The CHAIRMAN. What do you mean by "present conditions"?

Mr. ARNOLD. Well, the land is not being used efficiently.

Senator WHEELER. You mean by the Indians?

Mr. ARNOLD. By the Indians. It requires considerable work to place the land in proper condition to be irrigated. In the past this hasn't been done except in some few cases.

Senator WHEELER. Why hasn't it been done?

Mr. ARNOLD. The Indians haven't done it.

Senator WHEELER. The truth about it, with reference to a great deal of this reclamation service to the Indians, is that they have tried to make farmers out of the Indians when they are not fitted for farming, isn't that true?

Mr. ARNOLD. You can not make farmers out of all Indians.

Senator WHEELER. To make any money on irrigated land it takes considerable work?

Mr. ARNOLD. Indeed, it does; and these Indians out there have never been brought up to farming and don't know anything about farming.

Senator WHEELER. I believe that it true, so far as irrigated land is concerned.

Mr. ARNOLD. Yes, sir; so far as irrigated land is concerned.

Senator WHEELER. They may do dry land farming, and do raise some crops?

Mr. ARNOLD. Yes, sir. But when it comes to handling irrigation that must be done very carefully in order to avoid rendering some areas nonproductive due to alkali surface.

Senator WHEELER. The Indians have never made a success of it, have they?

Mr. ARNOLD. No; I wouldn't say they have.

Senator WHEELER. Have you any farmers on the reservation?

Mr. ARNOLD. We have stockmen, and an experimental station.

Senator WHEELER. What has this experimental farm ever done in teaching the Indians to irrigate land, and seeing that they get crops, and so on?

Mr. ARNOLD. I don't think they ever had a real irrigation farmer. The so-called "experimental farm" is a misnomer and has been ever since I have been there. It is a 40-acre tract of land most of which is above the irrigation ditch and no attempt has ever been made to irrigate it. There is probably 10 acres below the ditch which is irrigated with some difficulty because the ditch is just high enough

to get enough water over this dry area. Since I have been at Klamath this so-called "experimental farm" has been farmed for no other reason than to keep it from developing into a wheat patch. They have attempted to operate the farm, not as an experimental station, but as a separate unit. Some of the funds are used to operate the threshing machine and for like purposes, and not for operation of that particular area alone.

Senator WHEELER. How much does it cost to operate that farm each year?

Mr. ARNOLD. I haven't the figures on that, but it is a very normal sum, most of which is paid back. What is paid for the operation of the threshing machine is paid back to the Indians by the benefit coming from the operation of this machine.

Senator WHEELER. How much of an appropriation are you asking for the operation of that farm this year?

Mr. ARNOLD. I don't recall now.

Senator WHEELER. Are any of the white people making a living on that irrigated land out there?

Mr. ARNOLD. I recall one man who seems to be making considerable effort to level his land.

Senator WHEELER. One out of how many?

Mr. ARNOLD. Probably a dozen, who are farming much like the others are farming. They are not leveling their lands nor attempting to irrigate scientifically.

Senator WHEELER. How much does it cost to level land?

Mr. ARNOLD. I can't answer that positively, but I should say $75 per acre.

Senator WHEELER. To level it?

Mr. ARNOLD. That is the value of the land under irrigation. That is their present value of it.

Senator WHEELER. Is that the present value put on this leveling, or not?

Mr. ARNOLD. Well, it is, yes; in its present condition, I would say. That is the value these men had placed on their lands.

Senator WHEELER. Has there been any land sold at that figure at all?

Mr. ARNOLD. Not that I know of.

Senator WHEELER. Are these people that hold that land at $75 an acre able to make a living on it?

Mr. ARNOLD. I think they are; at least, they are continuing to live there.

The CHAIRMAN. On the whole, you seem to think that the money spent for irrigating purposes on the reservation has been a failure?

Mr. ARNOLD. Well, yes; unless better use can be made of the land. It will never be a success based on the projects near there. However, it is entirely possible that they could be made a success.

Senator WHEELER. How is it possible? Just to get down to the real practical standpoint, the Indians won't work it, will they, as an irrigated project, and can't make a living on it, can they?

Mr. ARNOLD. Some of them are using some water, but most of them are not using water for irrigation except in certain little patches.

Senator WHEELER. They are using water only in certain little patches.

Mr. ARNOLD. So it hasn't been of any real benefit to the Indians so far.

Senator WHEELR. Has the 10 acres that is under water for experimental purposes been a success?

Mr. ARNOLD. We have some fair crops raised there. Crops can be raised there.

Senator WHEELER. Why was this land above the ditch selected for the experimental farm?

Mr. ARNOLD. I couldn't tell you, Senator. That has been years ago and I haven't had anything to do with it.

The CHAIRMAN. I think you stated that it hasn't been used as an experimental farm since you have been there.

Mr. ARNOLD. Two or our men have been stationed there.

Senator PINE. Don't you think it necessary to demonstrate to these Indians that this land can be farmed successfully, this land that is under the irrigation ditch?

Mr. ARNOLD. I have recommended that that be done with the help of a farmer who really knows irrigation.

Senator WHEELER. Then, in order to make this a success you would have to get white settlers in there who understood irrigation, isn't that correct?

Mr. ARNOLD. No; I am not prepared to say that.

Senator WHEELER. According to this report there is only 350 acres being irrigated there by the whites and Indians together; isn't that correct?

Mr. ARNOLD. That was for 1928, I believe. In 1929 I understand there was about 900 acres on which operation and maintenance charges were paid. As to whether or not they are all irrigated, I can't say, because they are using water for other purposes, watering stock.

Senator WHEELER. Let us take the best figures we have got on it. You received money on a total of 900 acres. How much money was spent altogether on that reclamation project?

Mr. ARNOLD. I can't tell you, sir. I don't have those figures. The irrigation branch handles that.

Senator WHEELER. I just don't understand how it is that you haven't the figures with reference to reclamation projects on your own reservation. We go to a reservation and the superintendent says: "I don't know anything about this because it is the Reclamation Service." It seems to me that the superintendent of a reservation ought to have the figures as to what a project is costing on that reservation over which he is superintendent. You couldn't last in any business organization surely unless you kept closer track of it than that.

Mr. ARNOLD. As I said before——

Senator WHEELER (interrupting). I am not blaming you for it, particularly, I am blaming the system they have in the Indian Service in not requiring it to be done.

Mr. COLLIER. Do you know how much money was spent on it?—$250,000 to 1928. Here is a statement showing the land that has gone out of use. This is from the report of the irrigation advisors.

It shows that there has been a progressive decline. I will ask you about this:

	Acres
1922	3,161
1923	2,750
1924	2,059
1925	2,306
1926	358
1927	248

The acreage farmed by the Indians included in the above, is as follows:

	Acres
1923	2,035
1924	1,960
1925	1,342
1926	80
1927	62

Farmed by the Indians, and out of their funds, or charged up against the Indians, I understand there is something over $250,000; is that correct?

Mr. ARNOLD. I expect it is.

Mr. COLLIER. Have you ever been on any other Indian reservation in this country?

Mr. ARNOLD. On the Yakima.

Mr. COLLIER. You have come in contact with Indians from different reservations?

Mr. ARNOLD. Yes, sir.

Mr. COLLIER. As a matter of fact, the Klamaths are about the most advanced Indians in the Northwest?

Mr. ARNOLD. I believe they rate up on top.

Mr. COLLIER. What do you collect as construction costs out there?

Mr. ARNOLD. Originally it was $1.50 an acre annually for 20 years. Then, that has been spread over a period of 40 years, I believe, making it 75 cents per acre.

Mr. COLLIER. This report says that the present construction collection is 35 cents an acre.

Mr. ARNOLD. Is that for the Modoc Point project?

Mr. COLLIER. Perhaps I am wrong about it—yes, it is 75 cents an acre, construction charges.

Mr. ARNOLD. Yes, sir.

Mr. COLLIER. Are they paying construction charges?

Mr. ARNOLD. No, sir.

Mr. COLLIER. What is the maintenance charge?

Mr. ARNOLD. $1 an acre annually.

Mr. COLLIER. $1 an acre annually; is that whether they use water or not?

Mr. ARNOLD. It is, if it is charged against the project, whether they use it or not.

Mr. COLLIER. But the individual does not get water unless——

Mr. ARNOLD (interposing). He pays $1 an acre.

Mr. COLLIER. Then that is charged up to the tribal funds, is it?

Mr. ARNOLD. Yes, sir.

Mr. COLLIER. And it is made a lien upon the Indian's land?

Mr. ARNOLD. Yes, sir.

Senator WHEELER. And paid out of the Indian funds?

Mr. ARNOLD. In one case it is charged against the tribal funds, and in the other case it is an individual problem.

Senator WHEELER. The fact of the matter is that it is being charged up each year against the Indians and ultimately they are either going to have to pay it or lose the land, unless some action is taken by Congress to relieve it; isn't that correct?

Mr. ARNOLD. It is a lien against the land, but as to the policy followed—

Senator WHEELER (interrupting). If you follow the policy adopted by the department and by the Indian Bureau it means that the charges that are going to be piled up against this land are going to be so much that he can never pay it and that he will lose the land.

Mr. ARNOLD. Yes; unless he uses water.

Senator WHEELER. If he uses water it costs so much more, isn't that true?

Mr. ARNOLD. No.

Senator WHEELER. What does he pay for the use of water?

Mr. ARNOLD. He pays a dollar and the operation and maintenance charge.

Senator WHEELER. And what does he pay if he doesn't use water?

Mr. ARNOLD. He will probably pay it anyway; that is, it will be charged against his land.

Senator WHEELER. It will be charged against his land. Whether he is getting the benefit of it or isn't getting the benefit of it, it will be charged against his land. As a matter of fact, it is charged against him where he is down on the low lands where the alkali comes out of the ground and he can not raise anything, and isn't it charged against his land where it is above the irrigation district, in some instances, and he can not irrigate it?

Mr. ARNOLD. I rather think it is.

Senator WHEELER. Can anybody defend that sort of thing?

Mr. ARNOLD. I have recommended that the land be reclassified and a study made of the situation to correct that condition.

Senator WHEELER. It does seem to me that we ought to be perfectly frank and perfectly honest about these things, and tell what the facts are, and simply say that the Indians are not getting the benefit of reclamation and that something ought to be done to relieve the situation, instead of smoothing over the mistakes. Let us honestly say that we made mistakes and that they ought to be rectified. There isn't anybody who can seriously criticize the Reclamation Service or the Indian Bureau for having made an honest mistake. I condemn them because they seem to be afraid to admit they have made mistakes. They all made mistakes. It isn't any wonder to me that they made mistakes, because it was a new thing, it was an experimental thing, but I do blame them for trying to cover up the mistakes all the time. They ought to be frank enough to admit the mistakes.

Mr. SCATTERGOOD. That is the very point that was thrust on my attention this summer. We have urged that immediate relief should be had, and, as a result of that, bills have been introduced in the House of Representatives by the chairman of the Indian Affairs Committee, and these bills are now in process of being reported upon. One of them is for diverting all construction charges on Indian irrigation projects covering the lands in trust for the Indians. That is to say, the proposal is that as long as the land remains in Indian trust

ownership there should not be collected or charged against these lands construction charges. Of course, something must be done by Congress to wipe off similar charges on the books.

Then there is another bill for classification of just such lands as you have under discussion right now. These things are under way, and, as you all know, that is the status of the legislation. We only hope these bills will become law.

The CHAIRMAN. How much did you say, Mr. Arnold, was in the appropriations this year for maintenance of irrigation on the Klamath?

Mr. ARNOLD. I understand $3,500.

The CHAIRMAN. That is, for maintenance?

Mr. ARNOLD. I don't have charge of that.

The CHAIRMAN. Did you recommend that amount, or do you know who recommended it?

Mr. ARNOLD. I had nothing whatever to do with that. That comes from the irrigation branch.

The CHAIRMAN. I notice in this report that it has been running from $5,000 down to $4,000 in previous years. Are the Indians getting $3,500 worth of benefit out of that project that is being charged up against them?

Mr. ARNOLD. I don't expect that they are, at this time.

The CHAIRMAN. Then the question is, why should you keep on appropriating money and charge it up against their lands if they are not getting the benefit of it?

Mr. ARNOLD. If no appropriations are made, the construction will rapidly fall into decay, and it will require them to pay considerable money to reopen the project if it is ever done in the future. I rather think it would be good business to keep the project up.

The CHAIRMAN. Yes; I think that should be done, by all means.

Mr. SCATTERGOOD. We are very hopeful in the Indian Service of getting through Congress larger appropriations that will enable us to employ demonstration farmers, real farmers, men like the county agents they have in some States, and we would like to have one on each reservation. That is the theory, the goal to work for. Such men could get acquainted with the Indians and guide them, one at a time, in following real practical measures as to how to utilize the water and how to utilize the land to the best advantage. To-day they are so discouraged that many of them withdraw themselves and don't even use the water.

Senator WHEELER. If we want to render a real service to the Indians we have to face this problem or they are going to become paupers in the communities in which they live, or in the Nation. We have either got to take care of them in the future or else say we are going to charge off what the Government has paid out on these projects, and then try to educate them to try these facilities we have. We will either have to do that or put them in poor houses or support them by dole houses. I think it would be a wise policy for the Government if we wiped off these charges and started in to educate the Indians to do this kind of work.

The CHAIRMAN. We will have to close, it is after one o'clock. I want to thank the Commissioner and Assistant Commissioner of the Indian Bureau, and these other gentlemen, for appearing.

Mrs. IDA M. CRAWFORD. Mr. Chairman, I would like to ask the committee to consider a few questions:

What benefits are the white people receiving who own land under this Modoc Point project? Are they utilizing the water? How many are there, and what about the Modoc Point experimental farm operated by the Indian Bureau? Is it a paying proposition and a success under this same project? What part of the tribal fund is spent annually for the maintenance of this so-called experimental farm?

(Whereupon, at 1.10 o'clock p. m., the subcommittee adjourned subject to the call of the chairman.)

INDEX

Page

Advisors, irrigation, on Indian reservations (*see also* Preston-Engle report) 2210
Blackfeet irrigation project 2199, 2317, 2737
Abandonment of—
Recommended 2202
Proposed 2219, 2220
Complaints, project defects, and problems 2334
Failure of 2199
History of 2322
Irrigation development of, general plan 2327
Legislation, digest of 2319
Bonnin, R. T., Ute Reservation 2738
Bridges, tourists:
Constructed from Indian funds 2199
Lees Ferry Bridge 2204
Pima 2208
San Juan 2207
Carson Sinks irrigation allotment, Nevada 2337
Complaints, project defects, and problems 2346
Conclusions and recommendations 2345
History 2339
Irrigation development of, general plan 2342
Legislation, digest of 2338
Synopsis of 2337
Collier, John:
Coolidge Dam 2725
Fort Peck 2728
Irrigation charges against Indian funds 2712
Reimbursable charges against Indian funds 2713
San Carlos Dam project 2725
Colorado River Reservation irrigation project, Arizona 2347
Complaints, project defects, and problems 2361
History 2351
Irrigation development, general plan 2355
Legislation, digest of 2349
Project works, summary of 2356
Synopsis of 2347
Colville Reservation irrigation project 2363
Complaints, defects, and problems 2375
History 2367
Irrigation development, general plan 2370
Legislation, digest of 2366
Project work, summary of 2372
Recommendations 2363
Synopsis 2364
Crow Reservation irrigation project, Montana 2378
Complaints, project defects, and problems 2398
Development of, general plan 2387
History 2384
Legislation, digest of 2382
Project works, summary of 2391
Recommendations 2378
Synopsis 2379
Engle, C. A. (*see* Preston report) 2210

Page
Flathead Reservation irrigation project, Montana 2401
Complaints, project defects, and problems 2431
Development of, general plan 2421
History 2413
Legislation, digest of 2406
Recommendations 2401
Storage features 2415
Synopsis 2402
Flickinger, S. J 2199
Appropriations, unexpended balance of 2200
Fort Peck 2203
Fort Belknap Reservation irrigation project, Montana 2300, 2735
Complaints and problems of 2313
Irrigation on 2300
Legislation on, treaties, Executive orders, digest of 2303
Fort Hall Reservation irrigation project, Idaho 2466
Complaints, problems, and defects of 2470, 2492
Development of, general plan 2483
History 2475
Legislation, digest of 2472
Recommendations 2466
Synopsis 2467
Fort Peck Reservation irrigation project, Montana 2199, 2728
Abandonment proposed 2219
Complaints, defects, and problems 2528
Development, general plan of 2522
Failure 2220, 2199
Flickinger, statement of 2203
History 2518
Legislation, digest of 2514
Recommendations 2511
Synopsis 2512
Frear, Hon. James A.:
Indians afraid to talk 2209
Lees Ferry Indian bridge 2204
Pima Bridge 2207
Reimbursable funds, based on bureau recommendations, public scandal 2204
Reimbursable charges 2209
San Juan Bridge 2207
Gila River Reservation irrigation project 2440
Complaints, project defects, and problems 2459
Developments, general plan of 2454
History 2446
Legislation, digest of 2442
Recommendation 2440
Synopsis 2441
Indian Rights Association:
Lees Ferry Bridge 2205
Report on 2206
Work, Hubert, report of, to Congress 2205
Klamath Reservation irrigation project, Oregon 2730, 2497
Arnold, L. D 2744
Collier, John 2747
Complaints, project defects, and problems 2509
Crawford, D. W 2742
Crawford, Ida M 2750
Development, general plan of 2505
Legislation, digest of 2500
History of 2502
Project work, summary of 2506
Recommendations 2497
Synopsis 2498

Lees Ferry, Indian bridge: Page
Frear, statement of 2204
"Highway Robbery" 2205
Indian Rights Association, report of 2206
Navajos, charges against 2204
Work, Hubert, report to Congress 2205
Meritt, E. B., Pima Reservation, statement re 2208
Navajos:
Charges against, of $100,000 2208
Lees Ferry, charges against 2204
Reimbursable charges 2209
Northern Cheyenne (*see also* Tongue River) 2583
Abondonment of proposed 2219, 2220, 2585
Recommendations 2583
Pima Bridge 2207
Charges of $400,000 2208
Frear 2207
Meritt 2208
Preston-Engle report 2210–2661
Plan and outline of 2226
Introduction—
Abandonment of Fort Peck, Blackfeet, and Tongue River Reservations projects 2219
Allotting system, evils of 2220
Construction costs and collections 2218
Costs, collections, and assessments, June 30, 1927, Table No. 2 2225
Crop production 2218
Incomplete projects 2218
Irrigation activities, outstanding errors 2223
Irrigation service defects, organization and work of 2221
Operation and maintenance costs and collections 2219
Ownership of land acreage irrigated by Indians, lessees, and white owners 2217
Ownership tables showing status of June 30, 1927, Table No. 1 2224
Recommendations, general 2211
Rhoads, study of report by 2199
Utilization of project lands by Indians 2217
Body of report—
Abbot, F. H., secretary Board of Indian Commissioners, approval of, by Indian Bureau 2264
Act of August 1, 1914 2263, 2264, 2285, 2293, 2550
Abbot, commissioner, reason advanced justification for 2265
Appropriations, early, made reimbursable 2230
Appropriations, gratuitous, made reimbursable 2230, 2237
Construction costs, reimbursable 2229
Reimbursable Indian projects 2282
Reimbursable feature of law, interpretation by Attorney General 2267
Act of February 14, 1920, collections of construction costs 2230, 2267, 2286, 2550
Acquisition of Indian lands by whites 2279
Allotment and lands 2277, 2232
Acquisition of lands by whites 2236, 2279
Burke Act, May 8, 1906 2273
Defects of allotting system 2233
General allotment act 2232, 2272
Appropriations, welfare work 2227
Inherited Indian lands, sale of 2280, 2236
Irrigation—
Act of March 7, 1928 2268
Activities 2228
Allotments 2232
Appropriations, data, unreliable 2239
Accurate and reliable data necessary 2293, 2240
Appropriation made reimbursable, act of August 1, 1914 2230
Gratuitous 2230, 2237

Preston–Engle report—Continued.
Body of report—Continued.
Irrigation—Continued. Page
Attorney necessary 2228, 2257
Collections and construction costs, act of February 14, 1920 2267, 2230
Complaints common to many projects 2300, 2299
Coordination, lack of 2228
Construction costs, reimbursable (act of August 1, 1914) 2229, 2263
Construction, operation, and maintenance cost 2287, 2239
Excessive 2295
Cost accounting 2290
Cost and collections 2288, 2239, 2284, 2285
Policy of Indian Bureau as to 2289
Table to June 30, 1927 2288
Costs and repayment, table 2287
Data inaccurate and inadequate 2291, 2246, 2240
Complete data specifically requested by Congress 2293
Delinquent accounts, penalty on 2288
Governments first attempt at irrigation 2229
Grazing on agricultural land 2298
Irrigation, character of early work 2237
Indians unable to pay irrigation charges 2237
Demand reduction of charges 2284, 2238
Failure to comprehend importance of activities, chief cause of trouble 2256
Irrigation directors, summary of 2255
Lands, Indian, acquisition of, by whites 2279
Lands, Indian, more than used 2233, 2277
Land used under irrigation projects 2233
Laws, recommendations that they be compiled 2297, 2268
Legislation, general, and appropriations for 2262
Organization inadequate 2254, 2227
Reclamation necessary 2228, 2261
Analysis of 2243
Arid land reclamation 2261
Interior Department, two bureaus engaged in reclamation 2258
Cooperation plan 2259
Rules and regulations 2298
Reimbursable charges 2283, 2236
Recommendations as to 2290, 2260
Salaries inadequate, engineers 2257
U. S. *v.* Conrad Investment Co 2270
U. S. *v.* Skeen 2270
Board of Indian Commissioners approved act of August 1, 1914 2264
Bureau, Indian—
Abbott, approval of, recommendations re act of August 1, 1914 2269
Appropriations, exaggeration of, by officials 2294
Classification of employees 2295
Collections, policy as to 2289
Correspondence, unnecessary 2296
Data inaccurate and unreliable given by officials 2240
Defects and difficulties of 2254
Irrigation, failure to comprehend importance of, chief cause of trouble 2256
Missionary spirit inadequate 2294, 2240
Organization and activities of 2227
Sketch of 2252
Regulations, complaints as to 2297
Salaries inadequate, results of 2295, 2240
Superintendents should have more authority 2296
Handicapped by inefficient and inadequate office force 2296
Bureau of Reclamation Projects, report on, April 10, 1924 2280
Carson Sinks irrigation allotment, Nevada 2337
Claims against the Government result in laziness and improvidence among Indians 2297

Preston–Engle report—Continued. Page
Colorado River irrigation project, Arizona 2361
Colville irrigation project, Washington 2363
Conrad Investment Co. *v.* United States 2270
Crow Reservation irrigation project, Montana 2378
Earnings and income of Indians inadequate 2276
Economic conditions and extremes in civilization 2227
Employees 2227
Fee patented Indian lands, sale of 2280, 2236
Field work—
Scope of 2245
Itinerary 2245
Flathead irrigation project 2401
Fort Belknap irrigation project 2300
Fort Hall Reservation irrigation project, Idaho 2466
Fort Peck irrigation project, Montana 2199, 2511, 2728
Gila River Reservation irrigation project 2440
Health conditions 2275, 2234
Alleged inefficiency and incompetence of physicians 2275
Indians as farmers 2233, 2273
Advice and assistance, need of 2274, 2233
No real attempt made to make farmers of Indians 2221
Farm advisors, Indian Bureau failed to provide 2276, 2234
Financial assistance, need of 2275, 2234
Health conditions unsatisfactory, delay progress 2275, 2234
Income of Indian farmers 2218
Interest, unable to arouse 2277
Valuation survey 2238
Water rights and water supplies 2268, 2230
Water supplies inadequate 2231
Recommendations as to storage of 2279, 2272, 2299
Winters decision, inconsistency of practical application 2232, 2231, 2269
Itinerary 2245
Klamath Reservation irrigation project, Oregon 2497
Lands of deceased Indians, sale of 2236, 2280
Leasing of Indian Lands 2277, 2234
Legislation re necessity of consent of Indians to leasing 2252
Necessity for 2278, 2235
Policy enables Indians to live in idleness 2278, 2235
Origin and extent of survey 2226
Amended instructions re 2243
Itinerary 2245
Purpose of 2241
Population, Indian 2227
Problems, Indian 2226
Colonies, policy of 2249
Conditions of primitive Indians 2249
Defects of 2251, 2226
Ration system 2251
Reservation system 2250
Solution of attempted 2252
Southern States policy 2250
Title to America 2249
Treatment of Indians, early 2250
United States early policy 2249
Unable to enforce early humane policy 2250
Ration Indian system 2251
Recommendations, general 2254, 2248
Complete and accurate date should be furnished as to irrigation project 2293
Irrigation projects 2290, 2279, 2260
Irrigation laws be compiled 2268
Legislation, necessity consent of Indians to leasing lands 2252
Water supply 2270

Preston–Engle report—Continued.
Reimbursible— Page
Collections 2289
Construction costs (act of August 1, 1914) 2264, 2229
Bureau of Reclamation project report on April 10, 1924 2280
Indian projects 2282
Irrigation charges 2236
Unable to pay 2283
Legislation, affecting, trend of 2283, 2237
Inconsistency of, concerning 2284, 2238
Recommendations as to irrigation projects 2290
Reimbursible features of laws, interpreted by Attorney General 2267, 2290
Valuation survey 2238
Reservation system 2250
Shoshone, Wyo 2532
Skeen *v.* U. S 2270
Southern Ute Reservation irrigation project, Colorado 2556
Tongue River Reservation irrigation project, Montana. (*See* Northern Cheyenne.)
Uintah Reservation, Utah 2586
Walker River Reservation irrigation project, Nevada 2621
Welfare work, appropriations 2227
Wind River Reservation irrigation project. (*See* Shoshone.)
Yakima Reservation irrigation project, Washington 2631
Preston, Porter J. (*See* Engle; Teele) 2210
Pueblo Indians, San Juan Bridge, built and charged against funds without knowledge of Indians 2207
Reimbursable appropriations 2200
American Indian Defense Association, statement of 2725
Frear, statement by, bureau recommendations 2204, 2209
Goodrich, memo of 2717
Reimbursible accounts between United States and various Indian tribes, fiscal year ended June 30, 1928 2675
Rhoads, statement re 2200
Tabulation showing amount outstanding June 30, 1928 2210
Rhoads, Charles J., Commissioner of Indians Affairs 2209
Blackfeet irrigation project, further appropriations for 2202
General legislation 2201
Preston-Engle report 2199
Reimbursible appropriations 2200
Reimbursible charges against Indian funds 2197, 2201
San Carlos project 2825
San Juan Bridge:
Charges of $40,000 2208
Frear, statement by 2207
Pueblo Indians 2207
Scattergood, J. Henry, assistant commission of Indian Affairs 2198, 2210
Abandonment of certain projects 2203
Bridges, roads, etc., will submit revised items 2210
Fort Peck 2199
Legislation, will give further study to 2204
Shoshone Reservation irrigation project, Wyoming 2532
Complaints, project defects, problems 2549
History 2537
Irrigation development, general plan of 2540
Legislation, digest of 2536
Project works, summary 2543
Recommendations 2532
Synopsis 2533
Southern Ute Reservation irrigation project, Colorado 2556
Complaints, project defects, problems 2579
Irrigation development, general plan of 2567
Legislation, digest of 2560
Project works, summary of 2574
Recommendations 2556
Synopsis 2557
Teele, Ray P. (*see* Engle; Preston) 2210

Tongue River, Mont. (*See* Northern Cheyenne.)
Uintah Reservation irrigation project, Utah ..... Page 2586
Complaints, project defects, and problems 2614
History 2594
Irrigation development, general plan of 2601
Legislation, digest of 2590
Recommendations 2586
Synopsis 2587
Ute Reservation irrigation project, Utah, Bonnin, R. T., statement by 2738
Walker River Reservation irrigation project, Nevada 2621
Complaints, project defects, and problems 2631
History 2624
Legislation, digest of 2623
Project works, summary of 2628
Recommendations 2621
Synopsis 2622
Wind River Reservation irrigation project. (*See* Shoshone.)
Winters *v.* United States 2231, 2269
Work, Hubert, Secretary of Interior, report recommending Lees Ferry project 2205
Yakima Reservation irrigation project, Washington 2738, 2631
Complaints, projects defects, and problems 2655
History 2638
Irrigation development, general plan 2643
Legislation, digest of 2635
Project works, summary of 2655
Recommendations 2631
Synopsis 2632

○